
THE
SECOND
**SCIENCE PROJECT
INFORMATION INDEX**

EDITED BY
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INTRODUCTION

This second index is an extension of and is meant to be used in conjunction with the 1984 publication entitled Science Project Information Index, 1973-1983. The new work assembles references to recently-published books and magazines as well as to some slightly older worthwhile publications encountered after the first index went to press. It has been compiled by the science librarian responsible for the first index.

The new tome selectively analyzes some sixty-five books and also the 1984 and 1985 issues of those magazines included in the first index. There are approximately 3,000 entries arranged under roughly 1,000 subject headings. Over one-half of the indexed books are publications of 1983, 1984 or 1985, and all were published in 1978 or later. There is no duplication of indexed publications with the first index. The list of books and magazines examined may be found beginning on page 141.

Inclusion criteria and entry style were discussed in detail in the introduction to the first index and the same scheme is followed in this work. Subject authority is again Library of Congress Subject Headings, 9th ed. (1980) supplemented by natural vocabulary where logic dictates. Entry is alphabetical by subject heading. Within given subject headings brief titles or descriptions of material indexed are followed by abbreviated references to the sources of information, including pagination. The abbreviated references are to be matched with the full book or magazine information in the BOOKS AND MAGAZINES INDEXED section beginning on page 141. See page iv of the first index for detailed examples of forms of entry.

As is the case with the first index, generally speaking this publication will find use primarily by students, teachers and librarians involved with grades six through to the end of high school, with some allowance made for varying student ability. The range of years at which the publication is directed of necessity requires choice of material of an appropriate level by the students and their supervisors. Usually a sense of level of difficulty is easily gained from the subject heading or from the item title. In this new index additional assistance has been provided by giving a rough ranking of books according to level of difficulty. This ranking is presented in the booklist following the index and is to be interpreted in relation to the defined audience.

Although this new index can be used alone, its value will be considerably enhanced if used with the first index because the first work provides a much more detailed cross-referencing scheme. It should go without saying, too, that the books and magazines indexed are a necessity.

Items indexed in this and in the first volume have been obtained from existing library collections built by professional staff. There is, therefore, a degree of quality control. The compiler emphasizes, however, that both indexes were prepared and presented on the assumption that students would carefully examine the ideas and information referred to and use them with the professional guidance and assistance of their teachers. Not every entry is meant to provide the essence of a full-blown science project, but is meant, at least, as is the case with various tricks and puzzles, to pique curiosity or provide the seed of an idea which can then, with guidance, be developed, explored, or generalized.

And, finally, the compiler has tried to gather a large enough and an interesting enough group of references in the mad hope of stimulating interest in at least some aspect of science, interest which is obviously lacking in so many science project students who approach librarians.

Hope this helps!

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Making waves: standing wave demonstration makes understanding atomic structure as easy as falling off a surfboard. Sci Teach, Nov. '85, pp. 28-30

Some brief and general information on atomic and nuclear physics including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

ATWOOD MACHINE

See FORCE AND ENERGY

AUTOMATIC TIMERS

AC-powered short-time timer. In: Greene, Easy, pp. 92-93

Camera self-timer. In: Greene, Quick-N-Easy, pp. 26-27

Darkroom timer with beep alarm. In: Hawkins, Digital, pp. 170-187

FET timer and power MOSFET timers, etc. Computers & Electronics, Jan. '84, pp. 98-100, 102-103

Periodic clock - timer turns on five different things. In: Greene, Quick-N-Easy, pp. 87-89

Seven-minute timer. In: Greene, Easy, pp. 34-35

AUTOMOBILES

Alternator analyzer. In: Greene, Easy, p. 68

Audible turn signal. In: Traister, Third, pp. 8-9

Auto battery monitor. In: Greene, Easy, pp. 26-27

Car battery checker. In: Greene, Easy, pp. 36-37

Car theft alarm. In: Greene, Quick-N-Easy, pp. 40-41

Transistorized ignition system. In: Traister, Third, pp. 24-25

BACTERIA

Do mouthwashes really kill bacteria? Mouthwashes and disinfectants are good subjects for science fair projects but students must be careful to judge effectiveness correctly. Sci Teach, Sept. '84, pp. 34-40

Effectiveness of various disinfectants in controlling bacterial growth. In: Tocci, Chemistry, p. 117

Growing bacterial cultures. In: Challand, ...Life Sciences, pp. 10-11

Preventing the growth of bacteria. In: Challand, ...Life Sciences, p. 14

BAEYER TEST

Hydrocarbon testing - permanganate test (Baeyer test), bromine test, Friedel-Crafts test. In: Wilcox, Experimental, pp. 150-153

BALANCE

Altering the fulcrum of a seesaw. In: Catherall, Levers, p. 9

An ancient find; On Balances; and cents into your science courses - investigations of balance. Sci Teach, Oct. '84, pp. 32-35

Balance of forces: how far is one able to pull one side of a towel down across a towel rack before the towel slides off? In: Jacobson,

BALANCE (continued)

- Science, pp. 168-169
- Balancing act using a ruler and a hammer. In: Scienceworks, p. 8
- Balancing weights. In: Jacobson, Science, pp. 170-171
- Deep thinking on dominoes falling in a row and leaning out from the edge of a table. Sci Am, Aug. '84, pp. 122, 124, 126-130, and continuation concerning a number of arrangements for the balancing of dominoes in Sci Am, June '85, pp. 133-134
- Making a balancing game. In: Catherall, Levers, p. 6
- Making a mobile. In: Catherall, Levers, p. 7
- Using a seesaw. In: Catherall, Levers, p. 8
- What is gravity? Weighing things; gravity and movement; balancing tricks. In: Wilkes, Simple, pp. 28-29

BALANCE (WEIGHING INSTRUMENTS)

See SCALES (WEIGHING INSTRUMENTS)

BALLISTICS

- Projectile motion - various pieces of apparatus shown (brief information). In: Hilton, Physics, p. 12
- A projectile motion bullseye - studying projectile motion using a bow and arrow. Sci Teach, Feb. '85, pp. 31-33

BALLOONS

- Do balloons leak? In: Gardner, Kitchen, pp. 106-107
- Experimenting with balloon rockets. In: Challand, ...Earth Sciences, pp. 56, 84
- Falling balloons - speeds at which balloons filled with different gases fall. In: Gardner, Kitchen, pp. 104-106

BALLS (SPORTING GOODS)

- Success in racquetball is enhanced by knowing the physics of the collision of the ball with the wall. Sci Am, Sept. '84, pp. 215, 219-220, 222, 227, 230

BARKHAUSEN EFFECT

See MAGNETISM

BARNARD'S STAR

See STARS

BAROMETER

- Assembling barometers. In: Challand, ...Earth Sciences, pp. 72-73
- Making an aneroid barometer to monitor the weather; also some general information on meteorology. In: Science Activities, pp. 53-56

BASES (CHEMISTRY)

- Acid-base potentiometric titrations. In: Day, Quantitative, pp. 612-615
- Acids and bases; identification using litmus paper or unsweetened grape juice. In: Gardner, Kitchen, pp. 82-84
- Acids and bases - testing substances using phenolphthalein and turmeric. In: Cobb, Chemically Active, pp. 88-92
- Acids, bases and salts; testing acids and alkalis; neutralization reactions; etc. In: Chisholm, Introduction, pp. 28-29

BASES (CHEMISTRY)

BASES (CHEMISTRY) (continued)

- Analysis of an acid-base titration curve: the Gran plot. In: Harris, Quantitative, pp. 622-624
- Colorful solutions made easy - universal indicator in acid-base equilibrium. Sci Teach, Nov. '85, p. 47
- Exploring the chemical differences among bases. In: Tocci, Chemistry, pp. 86-87
- Preparing standard acid and base. In: Harris, Quantitative, pp. 617-618
- Strong and weak bases - some general information. In: Walters, Chemistry, pp. 20-21
- Various experiments showing how acids and alkalis behave and tests to distinguish between them - fizzy lemonade, invisible ink, dancing mothballs, indicators. In: Watson, Liquid, pp. 32-35
- Which antacid provides the best relief? How effective is an antacid? In: Tocci, Chemistry, pp. 87-93
- The wine and water trick, using phenolphthalein indicator, tartaric acid and potassium or sodium carbonate. In: McGill, Science, pp. 53-56

BATS

- A few suggestions for the investigation of bats. Also diagram of a bat skeleton. Sci Teach, May '85, pp. 36-37, and letter of correction Oct. '85, p. 54

BATTERIES

See ELECTRIC BATTERIES

BEANS

- Exploring plant ecology with bean plants; also general information on plant ecology. In: Science Activities, pp. 61-64

BEAUFORT WIND SCALE

See WINDS

BEETLES

- Beetles, including synopsis of families and much detailed information on identification, range, habits of and collecting methods for specific North American types (many illustrations). In: White, Field Guide, pp. 56-333
- Classifying and naming beetles. In: White, Field Guide, pp. 53-55
- Collecting beetles. In: White, Field Guide, pp. 6-31
- Growth and development of beetles. In: White, Field Guide, pp. 49-52
- Preparing and identifying beetles. In: White, Field Guide, pp. 32-42
- The structure of beetles. In: White, Field Guide, pp. 43-48
- Watching "worms" grow into beetles. In: Challand, ...Life Sciences, p. 48

BELLS

See also ELECTRIC BELLS

- People listening to a bell can perceive sounds the bell does not really make - investigating acoustic resonance. Sci Am, July '84, pp. 132-138

BENHAM'S DISK

See OPTICAL ILLUSIONS

BENZIL

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BENZILIC ACID (α -HYDROXYDIPHENYLACETIC ACID)

Benzilic acid rearrangement - general discussion, instructions for preparation of benzilic acid, and reactions of benzilic acid. In: Wilcox, Experimental, pp. 358-362

BENZOIC ACID

The Cannizzaro reaction - discussion of reactions of aromatic aldehydes and the preparation of benzyl alcohol from benzaldehyde; the extraction of benzoic acid. In: Wilcox, Experimental, pp. 291-294

Esters: general discussion of esterification and saponification, fats and fatty oils, detergents and wetting agents; instructions for esterification of acetic acid and preparation of methyl benzoate. In: Wilcox, Experimental, pp. 295-302

p-Aminobenzoic acid (PABA) and esters: preparation of PABA and esterification of PABA. In: Wilcox, Experimental, pp. 336-338

Side-chain oxidation of aromatic compounds, including preparation of p- and o-nitrobenzoic acids. In: Wilcox, Experimental, pp. 310-311

BENZOIN

See KETONES

BENZOIN CONDENSATION

The benzoin condensation, including discussion of vitamin B₁ catalysis, and preparation and reactions of benzoin and preparation and reactions of benzil. In: Wilcox, Experimental, pp. 348-357

BENZOQUINONE

See QUINONES

BERLESE FUNNEL

See SOILS - ANALYSIS

BERNOULLI'S LAW

See AERODYNAMICS; AIR PRESSURE

BICARBONATES

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BICYCLES AND TRICYCLES

Effect of degree of inflation of bike tires on friction. In: Scienceworks, p. 57

BIODEGRADATION

Reverse garden - experimenting with the natural degradability of various garbage items. In: Scienceworks, p. 26

BIOLOGY

BIOLOGY

See also MICROBIOLOGY

BIOLOGY - CLASSIFICATION

Keyed up: teach classification by having students forge their own keys.
Sci Teach, Nov. '84, pp. 46, 48-51

BIRD WATCHING

See BIRDS - STUDY AND TEACHING

BIRDS

Backyard birds - bird feeders and watering stations, bird shelters and houses, observing the birds' behavior. In: Brown, Investigating, pp. 29-46

A field formula for calculating the speed and flight efficiency of a soaring bird. Sci Am, Mar. '85, pp. 122, 124-128

Scientific projects with birds. In: Brown, Investigating, pp. 46-47

Special methods for observing birds. In: Brown, Investigating, pp. 49-54

BIRDS - FOOD

Backyard birds - bird feeders and watering stations, bird shelters and houses, observing the birds' behavior. In: Brown, Investigating, pp. 29-46

Experimental bird feeding. In: Heintzelman, Birdwatcher's, pp. 159-164

Making a bird feeder. In: Jacobson, Science, pp. 35-36

BIRDS - STUDY AND TEACHING

Bird-watching basics. In: Heintzelman, Birdwatcher's, pp. 9-22

City bird watching. In: Heintzelman, Birdwatcher's, pp. 141-158

Experimental bird feeding. In: Heintzelman, Birdwatcher's, pp. 159-164

Life history outline - outline for conducting typical life history

study of a bird species. In: Heintzelman, Birdwatcher's, pp. 236-241

Locality bird watching. In: Heintzelman, Birdwatcher's, pp. 53-77

Locally endangered species projects. In: Heintzelman, Birdwatcher's, pp. 203-222

Projects with birds of prey. In: Heintzelman, Birdwatcher's, pp. 103-139

Projects with waterfowl. In: Heintzelman, Birdwatcher's, pp. 79-102

BIRDS OF PREY

Projects with birds of prey. In: Heintzelman, Birdwatcher's, pp. 103-139

BLEACHING

Bleaching. In: Walters, Chemistry, p. 9

Chlorine compounds as disinfectants and bleaching agents. In: Tocci, Chemistry, pp. 116-120

Chlorine from household bleach. In: Cobb, Chemically Active, pp. 74-76

Determination of bleaching power by iodometry. In: Day, Quantitative, pp. 601-602

Invisible ink, and making the visible invisible. In: Gardner, Kitchen, pp. 75-76, 78

Making real ink disappear. In: Gardner, Kitchen, pp. 78-79

BLOOD - ANALYSIS AND CHEMISTRY

Making a fresh blood smear and observing blood cells under a microscope. In: Challand, ...Life Sciences, p. 72

BLOOD GROUPS

Typing blood. In: Challand, ...Life Sciences, pp. 74-75

BLUEPRINTS

Making blueprint paper. Sci Teach, Dec. '85, p. 48

BOATS AND BOATING - MODELS

How to make your own sailing boat. In: Fitzpatrick, On the Water, pp. 26-27

Magic boat - a magnetic boat. In: Ardley, Exploring, p. 9

BOILING

Low-energy breakfast - boiling eggs with the pot covered or uncovered; boiling eggs with the water boiling vigorously or gently. What is the difference in results? In: Scienceworks, p. 58

Making water boil by cooling. In: Challand, ...Earth Sciences, pp. 61,84

BOILING POINTS

Boiling point determination of water. In: Tocci, Chemistry, pp. 5-6

Boiling points of micro samples. In: Wilcox, Experimental, pp. 128-129

BONES

Exploring bone to discover many of its important characteristics; also some general information on bone. In: Science Activities, pp. 33-36

Testing the structure of bone using chicken bones. In: Challand, ...Life Sciences, p. 58

BREAD

Experimenting with and detecting preservatives used in bread - propionates; making other esters. In: Tocci, Chemistry, pp. 54-57

Making unleavened bread. In: Jennings, Everyday Chemicals, pp. 11-12

Yeast enzyme for making bread and in reaction with fruit juice. In: Watson, Liquid, pp. 38-39

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BRIDGES - MODELS

Bridges using drinking straws, and building a bridge you can walk on. In: Zubrowski, Messing Around, pp. 42-53

BROMINE

Coulometric titration of cyclohexene with bromine. In: Harris, Quantitative, p. 631

Hydrocarbon testing - permanganate test (Baeyer test), bromine test, Friedel-Crafts test. In: Wilcox, Experimental, pp. 150-153

BROWNIAN MOVEMENTS

BROWNIAN MOVEMENTS

Some brief and general information on atomic and nuclear physics, including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

BUBBLES

Blowing bubbles. In: Watson, Liquid, p. 30
Sinking bubbles, floating bubbles. In: Gardner, Kitchen, pp. 37-38

BUILDINGS

Building houses with drinking straws, including making the frames, testing model strengths and constructing different types of roofs. In: Zubrowski, Messing Around, pp. 10-41
Diagonals and triangles multiplied - drinking straw building frameworks. In: Zubrowski, Messing Around, pp. 58-63
Frames give buildings strength. Experimenting with various frames using newspapers, toothpicks, etc. In: Scienceworks, pp. 70-71
Making tall structures with drinking straws. In: Zubrowski, Messing Around, pp. 54-57

BUOYANCY

Archimedes' Principle - water's buoyant force used to determine metal cylinder's density (brief information). In: Hilton, Physics, p. 25
Bouncing mothballs. In: Gardner, Kitchen, pp. 84, 86
Dancing raisins. In: Gardner, Kitchen, p. 86
The eggs that read - demonstration of sinking, floating and "swimming" eggs placed in water and other solutions of differing densities. In: McGill, Science, pp. 59-60
Exploring water - experiment with the Cartesian diver. In: Science Activities, pp. 17-18
Finding out about buoyancy. In: Challand, ...Earth Sciences, pp. 17, 82
Floaters and sinkers. In: Wilkes, Simple, pp. 18-19
Many investigations into whether items float or sink, effect of shape on floatation, etc. In: Fitzpatrick, On the Water, pp. 2-29
Restless mothball demonstration. In: McGill, Science, p. 65
The roaming mothball. Sci Teach, Dec. '85, pp. 46, 48
Scientific centrepiece - rising and sinking mothballs. In: Scienceworks, p. 86
Sinking balloons, floating balloons - experiments with liquids of different density. In: Gardner, Kitchen, pp. 38-39
Swimming egg. In: Watson, Liquid, p. 19
Two experiments involving buoyancy. In: Arnov, Water, pp. 47-51
Why do things such as steel ships float? In: Kent, Introduction, p. 25

BURGLAR ALARMS

Black tube alarm. In: Greene, Quick-N-Easy, pp. 64-65
Building electric burglar alarms. In: Math, Wires, pp. 59-62
Burgle-proof: making a simple light-controlled burglar alarm. Sci Teach, Sept. '85, pp. 27-29
Car theft alarm. In: Greene, Quick-N-Easy, pp. 40-41
Mugger bugger - alarm for attaché case, shopping bag, purse, etc. In:

BURGLAR ALARMS (continued)

- Greene, Easy, pp. 20-21
Theft alarm. In: Greene, Easy, pp. 69-71

BUTTER

- Fats and margarines: what are polyunsaturates? Testing using iodine and an organic solvent. In: Chisholm, Introduction, p. 35
Making butter. In: Scienceworks, p. 68
Milky emulsion of cooking oil and water; salad dressing as an emulsion; butter as an emulsion. In: Watson, Liquid, pp. 23-24

CABBAGE

- Essence of cabbage - using cabbage to make a chemical indicator. In: Cobb, Chemically Active, pp. 8-11
Red cabbage - a natural indicator; also substances which might be checked for pH; using universal pH paper. In: Tocci, Chemistry, pp. 74-75
Testing for acids and bases with red cabbage indicator. In: Walters, Chemistry, p. 16

CAFFEINE

- Topics and questions for investigation in chemistry - ascorbic acid, caffeine, milk, colloids, artificial sweeteners, and crystallization. In: Tocci, Chemistry, pp. 30-31

CALCIUM

- EDTA titration of Ca^{2+} and Mg^{2+} in natural waters. In: Harris, Quantitative, pp. 624-625
Gravimetric determination of calcium as $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$. In: Harris, Quantitative, p. 615

CALCIUM ACETATE

- A substitute for charcoal, using ethanol and calcium acetate. In: Tocci, Chemistry, pp. 160-161

CALCIUM CARBONATE

- Calcium carbonate in egg shells. Sci Teach, April '85, pp. 30-33

CALCIUM CHLORIDE

- Changing two liquids to a solid using calcium chloride and potassium carbonate. In: McGill, Science, p. 66
Dissolving calcium chloride in water and then ammonium nitrate in water to demonstrate production and absorption of heat. Sci Teach, Jan. '84, pp. 29-30

CALORIMETERS AND CALORIMETRY

- A calorimeter - what every weight watcher needs. In: Tocci, Chemistry, pp. 33-37
How much energy does it take to heat the water for your shower? In: U.S. Department of Energy, Science, pp. [17-18] and see also teacher's guide

CAMERA LUCIDA

CAMERA LUCIDA

Instant artist - simple version of the camera lucida, used to enlarge or to reduce drawings. In: Scienceworks, p. 82

CAMERA OBSCURA

Reinvent the camera. In: Scienceworks, pp. 72-73

CAMERAS

Camera self-timer. In: Greene, Quick-N-Easy, pp. 26-27

Cameras and films - elementary general discussion. In: Cooper, How Everyday, pp. 30-33

Making and taking a photograph with a pinhole camera. In: Kent, Introduction, pp. 8-9

Personal pin-hole "camera". Sci Teach, Mar. '84, p. 61

Properties of light: pin hole camera, inverse square law, mirrors (brief descriptions). In: Hilton, Physics, pp. 69-70

CAMPHOR

Camphor boat. In: Watson, Liquid, pp. 30-31

Lighted piece of camphor will dart around on water like a jet.

In: McGill, Science, pp. 65-66

Wagner-Meerwein rearrangements: camphor from camphene. In: Wilcox, Experimental, pp. 387-389

CANDLES

Air and burning. In: Jennings, Everyday Chemicals, p. 28

Candle experiments - observation of the flame and of the wick, burning a candle under a jar. In: Gardner, Kitchen, pp. 87-98

Dry water - lycopodium powder is invisible on skin and will keep hand dry when it's dipped in water; same powder will make spectacular flash in a candle flame. In: McGill, Science, p. 67

Oxygen and a burning candle; also experiment using steel wool. In: Gardner, Kitchen, pp. 94-98

Revolving cardboard snake above candle. In: McGill, Science, pp. 113-114

Some ideas for demonstrations with candles (in the section "Teaching the Very Basics"). Sci Teach, Oct. '85, pp. 50-51, and see correction Dec. '85, p. 52

CANNIZZARO REACTION

The Cannizzaro reaction - discussion of reactions of aromatic aldehydes and the preparation of benzyl alcohol from benzaldehyde; the extraction of benzoic acid. In: Wilcox, Experimental, pp. 291-294

CAPACITORS AND CAPACITANCE

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Capillary attraction. In: Zubrowski, Ball-Point Pens, pp. 27-29

Capillary attraction - two demonstrations. In: McGill, Science, pp. 102-105

Climbing water; how water defies gravity. In: Gardner, Kitchen, pp. 12-18

Experimenting with capillarity and water cohesion. In: Challand, ...Life Sciences, pp. 28, 84

How does water move up and down in soil? In: Jacobson, Science, pp. 130-131

How much water will a brick soak up? In: Jacobson, Science, p. 45

CAPILLARITY (continued)

- More experiments with climbing liquids; experimenting with liquids other than water. In: Gardner, Kitchen, p. 18
Striped celery, changing colors of flowers, and preserving leaves through capillarity using glycerine. In: Watson, Liquid, pp. 8-11
Two experiments involving capillarity. In: Arnov, Water, pp. 56-59
Water-flows-up-tree mystery -- demonstration with celery stalk and colored water. In: Scienceworks, p. 35

CARBOHYDRATES

- Testing for carbohydrates. In: Challand, ...Life Sciences, p. 62

CARBON

- Checking substances for the presence of carbon. In: Cobb, Chemically Active, p. 72
Element identification - carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131

CARBON DIOXIDE

- Bouncing mothballs. In: Gardner, Kitchen, pp. 84,86
Breathing - the lime water test. In: Walters, Chemistry, p. 9
Carbon dioxide and baking. In: Gardner, Kitchen, p. 72
Dancing raisins. In: Gardner, Kitchen, p. 86
Extract of soda pop. In: Cobb, Chemically Active, pp. 11-16
Fermenting some fruit juice and testing the gas produced with limewater. In: Chisholm, Introduction, p. 31
Fire extinguisher gas using vinegar and baking soda. In: Gardner, Kitchen, pp. 36-37
Magic with dry ice - approximately a dozen tricks and demonstrations using dry ice (solid carbon dioxide). In: McGill, Science, pp. 78-91
Making carbon dioxide. In: Jennings, Everyday Chemicals, p. 11
Measuring the effect of carbon dioxide in blood on breathing rate. In: Challand, ...Life Sciences, p. 70
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Testing chemicals in exhaled air - testing for carbon dioxide using bromothymol blue and also using limewater. In: Challand, ...Life Sciences, pp. 66, 87
Testing gases plants give off. In: Challand, ...Life Sciences, pp. 23, 83

CARBONATES

- Analysis of a mixture of carbonate and bicarbonate. In: Harris, Quantitative, p. 619
Changing two liquids to a solid, using calcium chloride and potassium carbonate. In: McGill, Science, p. 66

CARBOXYLIC ACIDS

- Ionization of carboxylic acids, including instructions for measuring the pK of a carboxylic acid. In: Wilcox, Experimental, pp. 303-308

CASEIN

CASEIN

Casein glue. In: Watson, Liquid, pp. 26-27

CASTING (FISHING)

Fly casting illuminates the physics of fishing. Sci Am, July '85, pp. 122-126, 128

CATALYSIS

Experiment using a catalyst - decomposition of hydrogen peroxide.

In: Chisholm, Introduction, pp. 24-25

Lab experiment demonstrating effect of enzyme catalase on decomposition of hydrogen peroxide - this column provides two modifications to the common experiment, one regarding extraction of the enzyme from liver and the other involving a simple manometer. Sci Teach, Jan. '84, p. 62

CAVES

Cardboard cave - to aid in understanding geologic time, cave formations and cave life. Sci Teach, Feb. '85, pp. 58-59

CELERY

Striped celery, changing colors of flowers, and preserving leaves through capillarity using glycerine. In: Watson, Liquid, pp. 8-11

CELLS

Causing cells to lose water by using salt - plasmolysis. In: Challand, ...Life Sciences, p. 34

Discovering the areas of mitosis in stems and roots. In: Challand, ...Life Sciences, pp. 35, 85

Making a fresh blood smear and observing blood cells under a microscope. In: Challand, ...Life Sciences, p. 72

Making 3-D clay models of leaf cells. Sci Teach, Oct. '84, pp. 59-60

Watching movement in living cells - Elodea is a good choice. In: Challand, ...Life Sciences, p. 34

CENTER OF MASS

Balancing act using a ruler and a hammer. In: Scienceworks, p. 8

Center of gravity - will it tip? In: Jacobson, Science, pp. 166-167

Center of mass apparatus (brief information). In: Hilton, Physics, p. 20

Four "center of gravity" demonstrations. In: McGill, Science, pp. 116-121

Stability - center of gravity shifts as plastic bottle is filled with water. In: Kent, Introduction, p. 23

CENTRIFUGAL FORCE

Centrifugal force. In: Kent, Introduction, p. 29

Centrifugal force - three demonstrations. In: McGill, Science, pp. 106-111

Finding out about centrifugal force. In: Challand, ...Earth Sciences, pp. 41, 83

CERIUM

Preparation of a 0.1N cerium(IV) solution and standardization of the solution. In: Day, Quantitative, pp. 593-595

Redox titrations to illustrate the potentiometric technique - titration of iron(II) with dichromate or cerium(IV) solution. In: Day,

CERIUM (continued)

Quantitative, pp. 615-616

CHARCOAL

Making charcoal. In: Challand, ...Earth Sciences, p. 21

CHEESE

Curd cheese - made by splitting up an emulsion. In: Watson, Liquid, pp. 24-25

Making cheese by adding buttermilk to milk. In: Tocci, Chemistry, pp. 21-22

CHEMICAL APPARATUS

Accessory laboratory operations - drying agents, cooling baths, refluxing, gas absorption traps, mechanical and magnetic stirring, rotary evaporation. In: Wilcox, Experimental, pp. 116-122

General discussion of certain items of special interest to the analytical chemist - wash bottles, stirring rods, dessicators, pipets, burets, funnels, flasks, etc., and techniques of using some of them. A section on calibration. In: Day, Quantitative, pp. 526-548

CHEMICAL COMPOUNDS

See also, e.g., HETEROCYCLIC COMPOUNDS; names of specific compounds and groups of compounds

Boiling points of micro samples. In: Wilcox, Experimental, pp. 128-129

Identification of organic compounds by chemical methods -- preliminary examination, purification of unknown, physical constants, element identification, solubility classification, functional group identification, derivatization of functional groups. Many specific test procedures and instructions for derivative preparation given. In: Wilcox, Experimental, pp. 125-181

What is a chemical reaction? Reactions which produce heat or use light. Making a compound. In: Chisholm, Introduction, pp. 12-13

CHEMICAL ELEMENTS

Element identification - carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131

The language of chemists - organizing the elements; structure of the atom; chemical bonds; symbols, formulas, and equations; reading the periodic table (brief, simple, general discussions). In: Cobb, Chemically Active, pp. 101-120

CHEMICAL EQUILIBRIUM

Colorful solutions made easy - universal indicator in acid-base equilibrium. Sci Teach, Nov. '85, p. 47

Polarographic measurement of an equilibrium constant. In: Harris, Quantitative, pp. 629-631

Spectrophotometric measurement of an equilibrium constant. In: Harris, Quantitative, pp. 633-634

Thermal equilibrium in solutions - a study of $\text{Cu}^{2+}(\text{aq})$. Sci Teach, Feb. '84, p. 52

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CHEMICAL LABORATORIES

General laboratory directions: neatness and cleanliness, planning and efficiency, reagents, apparatus, basic techniques, safety, recording data. In: Day, Quantitative, pp. 522-551

CHEMICAL REACTIONS

Aldol condensation, including preparation of dibenzalacetone. In: Wilcox, Experimental, pp. 345-347

Benzilic acid rearrangement - general discussion, instructions for preparation of benzilic acid, and reactions of benzilic acid. In: Wilcox, Experimental, pp. 358-362

The benzoin condensation, including discussion of vitamin B₁ catalysis, and preparation and reactions of benzoin and preparation and reactions of benzil. In: Wilcox, Experimental, pp. 348-357

The Cannizzaro reaction - discussion of reactions of aromatic aldehydes and the preparation of benzyl alcohol from benzaldehyde; the extraction of benzoic acid. In: Wilcox, Experimental, pp. 291-294

"Capturing smoke in a glass of water" - demonstration using sulphuric acid and a sodium thiosulphate solution. In: McGill, Science, p. 58

Changing two liquids to a solid using calcium chloride and potassium carbonate. In: McGill, Science, p. 66

Chemical color trick: blue again...and again. In: Cobb, Chemically Active, pp. 144-147

Chemical color trick: blush test - making the cheeks of a face in a drawing or photo turn red. In: Cobb, Chemically Active, pp. 142-144

Chemical color trick: the water-to-wine-to-water gambit. In: Cobb, Chemically Active, pp. 140-142

Chemical color trick: 'thought waves for milk'. In: Cobb, Chemically Active, pp. 148-150

Chemical color trick: turning root-beer-colored liquid clear. In: Cobb, Chemically Active, pp. 147-148

Chemical kinetics: solvolysis of t-butyl chloride. In: Wilcox, Experimental, pp. 245-249

Chemical light show using a variety of chemicals. Sci Teach, Jan. '84, pp. 30-31

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange -- 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Color changing powder - demonstration of color change on mixing of potassium iodide and lead nitrate. In: McGill, Science, pp. 63-64

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- Experiment using a catalyst - decomposition of hydrogen peroxide.
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- Experiments in speeding up chemical reactions and slowing them down.
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- Foaming colors: chemical color change demonstration using sodium hydroxide solution, Universal Indicator, and dry ice. Sci Teach, Jan. '84, p. 64
- Free-radical halogenation discussion, including instructions for photochemical chlorination of 2,3-dimethylbutane and investigation of substituent effects in free-radical chlorination. In: Wilcox, Experimental, pp. 225-232
- Friedel-Crafts reactions - discussions of alkylation and acylation, including instructions for preparation of 4-acetylbiphenyl.
In: Wilcox, Experimental, pp. 312-317
- Glaser-Eglinton-Hayes acetylene coupling, including instructions for oxidative coupling of 1-ethynylcyclohexanol. In: Wilcox, Experimental, pp. 272-275
- Iodine clock reaction. Sci Teach, Sept. '84, p. 31, and comments and corrections Mar. '85, p. 64
- Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63
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- Metal cleaner - experiments with metals, vinegar and salt. In: Gardner, Kitchen, p. 42
- A multiple-step synthesis - from n-butyl alcohol to 2-methylhexenes.
In: Wilcox, Experimental, pp. 258-266
- Nitration of anilines: use of a protecting group. Includes instructions for acetylation of aniline in water and in acetic acid and direct acetylation with acetic acid. Also discussion of nitration of acetanilide and deacetylation with preparation instructions for p-nitroaniline and p-nitroacetanilide. In: Wilcox, Experimental, pp. 324-330
- Nitration of aromatic compounds, including discussion of mechanism and preparation of m-dinitrobenzene, p-bromonitrobenzene, and methyl m-nitrobenzoate. In: Wilcox, Experimental, pp. 318-323
- The pinacol-pinacolone rearrangement - general discussion and instructions on preparation of benzopinacol by photochemical reduction and the production of benzopinacolone. In: Wilcox, Experimental, pp. 373-377
- Reactions of aldehydes and ketones, including discussions of carbonyl addition reactions and reduction of carbonyl compounds. Two experiments given. In: Wilcox, Experimental, pp. 281-286
- Second-order nucleophilic substitution, including preparation of n-butyl iodide. In: Wilcox, Experimental, pp. 241-244
- 7-Up clock reaction. Sci Teach, Sept. '84, p. 31, and comments and corrections Mar. '85, p. 64
- Side-chain oxidation of aromatic compounds, including preparation of p- and o-nitrobenzoic acids. In: Wilcox, Experimental, pp. 310-311
- Speedy and not-so-speedy Alka-Seltzer (reaction rate observation).
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- Sulfur clock reaction. *Sci Teach*, Sept. '84, p. 31, and comments and corrections Mar. '85, p. 64
- Triphenylmethanols - general discussion, Grignard synthesis, β,β,β -triphenylpropionic acid from triphenylmethanol. In: Wilcox, *Experimental*, pp. 363-368
- Using flash bulbs, magnesium, copper and sulphuric acid to demonstrate electricity production. *Sci Teach*, Jan. '84, p. 32
- Wagner-Meerwein rearrangements: camphor from camphene. In: Wilcox, *Experimental*, pp. 387-389
- Ways of knowing that a chemical reaction is taking place - experiments involving giving off of energy or of a gas, precipitate formation, color change. In: Cobb, *Chemically Active*, pp. 42-59
- What is a chemical reaction? Reactions which produce heat or use light. Making a compound. In: Chisholm, *Introduction*, pp. 12-13
- Where does the gas come from? Do certain kitchen substances react with aspirin? And what puts the fizz in Alka-Seltzer? In: Gardner, *Kitchen*, pp. 119-120

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CHEMICALS

- Identifying substances - clues to help you identify an unknown substance. In: Chisholm, *Introduction*, pp. 38-39
- Looking at chemicals - kinds of questions chemists ask. In: Chisholm, *Introduction*, p. 5
- Simple tests to determine whether substances dissolve, float, sink or remain suspended in water. In: Jennings, *Everyday Chemicals*, pp. 25-26
- The various classes of reagents available (with regard to purity). In: Day, *Quantitative*, pp. 524-526

CHEMISTRY

See also various headings beginning with CHEMICAL; names of specific chemical substances and groups of substances; FILTERS AND FILTRATION; INDICATORS AND TEST PAPERS; and other such more specific headings

- The language of chemists - organizing the elements; structure of the of the atom; chemical bonds; symbols, formulas, and equations; reading the periodic table (brief, simple, general discussions). In: Cobb, *Chemically Active*, pp. 101-120

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- Accessory laboratory operations - drying agents, cooling baths, refluxing, gas absorption traps, mechanical and magnetic stirring, rotary evaporation. In: Wilcox, *Experimental*, pp. 116-122
- Chemical laboratory general precautions, apparatus, weighing and measuring reagents, heat sources, stirring - an introduction. In: Wilcox, *Experimental*, pp. 1-13
- General precautions for the organic chemistry laboratory, and some comments on accidents. In: Wilcox, *Experimental*, front end-papers(2pp.) and back end-paper(1p.)

CHEMISTRY - EXPERIMENTS (continued)

General remarks on preparing for a chemical synthesis - preparation before the lab, calculation of yields, laboratory directions, etc.
In: Wilcox, Experimental, pp. 217-224

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Identification of organic compounds by chemical methods - preliminary examination, purification of unknown, physical constants, element identification, solubility classification, functional group identification, derivatization of functional groups. Many specific test procedures and instructions for derivative preparation given. In: Wilcox, Experimental, pp. 125-181
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 Chlorine from household bleach. In: Cobb, Chemically Active, pp. 74-76
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- Determining the role of chlorophyll. In: Challand, ...Life Sciences, pp. 24-25, 84
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- Falling water - experiment involving different sizes of water streams breaking into drops. In: Gardner, Kitchen, pp. 23, 25
- Heaping liquids, including water - experimenting with filling a container above the rim with various liquids. In: Gardner, Kitchen, pp. 9-10
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- Water wonder - making water bulge above the top of a glass; effect of adding some dishwashing liquid to the water. In: Scienceworks, p. 43

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- From colloid to solution in one easy step - suggestion for an experiment. In: Tocci, Chemistry, pp. 23-24
- Topics and questions for investigation in chemistry - ascorbic acid, caffeine, milk, colloids, artificial sweeteners and crystallization. In: Tocci, Chemistry, pp. 30-31
- What is a colloid? General discussion and three experiments. Sci Teach, Sept. '85, pp. 49-51

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- Chemical color trick: blue again...and again. In: Cobb, Chemically Active, pp. 144-147
- Chemical color trick: blush test - making the cheeks of a face in a drawing or photo turn red. In: Cobb, Chemically Active, pp. 142-144
- Chemical color trick: the water-to-wine-to-water gambit. In: Cobb, Chemically Active, pp. 140-142
- Chemical color trick: 'thought waves for milk'. In: Cobb, Chemically Active, pp. 148-150
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- Color and the sun's rays - how long does it take various colors of paper to burn. In: Adams, Catch, pp. 41-42
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- The color disc - spinning it fast enough makes it appear white. In: McGill, Science, p. 127
- Color illusions and other optical illusions: case of the bulging borders; the Hermann grid; the cornsweet illusion; Meyer's experiment; Benham's top and other spin-offs; Purkinje effect. In: Cobb, How to, pp. 70-82
- Colored light - making rainbows; disappearing colors - blending colors with a spinning color wheel; making colored viewers. In: Wilkes, Simple, pp. 24-25
- Colorful solutions made easy - universal indicator in acid-base equilibrium. Sci Teach, Nov. '85, p. 47

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Make a color mixer - circular card with segments the colors of the rainbow. In: Kent, Introduction, p. 13

The red hand - wet hand placed on paper containing some sodium sulphocyanate (caution indicated in instructions) will turn red. In: McGill, Science, pp. 70-71

Various pieces of apparatus useful for color demonstrations - Welch apparatus, Cenco apparatus and a filtergraph (brief descriptions). In: Hilton, Physics, p. 77

The wine and water trick using phenolphthalein indicator, tartaric acid and potassium or sodium carbonate. In: McGill, Science, pp. 53-56

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How things burn; weighing the ash -- when paper and magnesium are burned, is the ash produced heavier or lighter? In: Walters, Chemistry, pp. 6-7

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Sun energy can burn paper. In: Adams, Catch, pp. 39-40

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Comets: a guide to observation, photography, and discovery. In: Sherrod, Complete Manual, pp. 61-91, 280

How best to see Halley's comet while it is in view during the next few months. Sci Am, Nov. '85, pp. 170-178

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How to make your own compass card. In: Fitzpatrick, Magnets, p. 27

The magnetic compass: make a compass and see how sensitive it is to magnetic fields. In: Ardley, Exploring, pp. 14-15

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- Analog computers. Computers & Electronics, Sept. '84, pp. 24, 28, 31, 113-114, and Oct. '84, pp. 16, 18, 20, 22
- Analog sensors for personal computers - how personal computer with analog to digital converter is able to expand capabilities of simple circuit: light meters, etc. Computers & Electronics, Feb. '84, pp. 82, 84-88, 90
- Appliance/computer hookup. In: Greene, Easy, p. 76
- Computer aided drafting. Computers & Electronics, June '84, pp. 14, 20-21, 24, 105; and July '84, pp. 74-77, 97
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- Computer controlled light meter. Computers & Electronics, Aug. '84, pp. 18, 21-22, 76-77
- Experimenting with computer art. Computers & Electronics, May '84, pp. 26-27, 32-33
- Home electricity computer program -- works out how much electricity various home appliances use. Program given with necessary modifications for various computer models. In: Kent, Introduction, pp. 42-45
- Optoelectronic digitizer. Computers & Electronics, Dec. '84, pp. 22-23, 26, 28
- Use your TRS-80 color computer as a storage oscilloscope. Computers & Electronics, Feb. '84, pp. 64-66, 98-101
- Wold, Computer Science: Projects for Young Scientists
-how to use microcomputers to prepare and present science projects

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- Causing dew and frost to form. In: Challand, ...Earth Sciences, pp. 61, 84
- Evaporation and condensation; experiment with a teakettle. In: Arnov, Water, pp. 31-34
- Experimenting with condensation. In: Challand, ...Earth Sciences, pp. 66, 85
- Fog and cloud chamber - use of 1.5L clear glass jugs. Sci Teach, Feb. '84, p. 53
- Homemade rain - condensation demonstration simulating rain. In: Scienceworks, p. 32
- Water from air; what is steam? Where does rain come from? -- various demonstrations and discussions of water condensation. In: Wilkes, Simple, pp. 12-13

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- Capacitor measurer. In: Greene, Quick-N-Easy, pp. 62-63

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- Constructing a constellarium with a flashlight and lidded containers. In: Challand, ...Earth Sciences, p. 53
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- An inexpensive star chart. Sci Teach, Dec. '85, p. 47

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Star charts showing the constellations and major stars. In: Traister, Astronomy, pp. 183-189

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Cooking outdoors with simple equipment demonstrates aspects of thermal physics. Sci Am, Aug. '85, pp. 114-118, 120

Gismos that apply non-obvious physical principles to the enjoyment of cooking. Sci Am, June '84, pp. 146, 150-154

Low-energy breakfast - boiling eggs with the pot covered or uncovered; boiling eggs with the water boiling vigorously or gently. What is the difference in results? In: Scienceworks, p. 58

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Tests: memory, audio-visual reaction time, hand-eye coordination, centering ability, optical illusion, etc. Computers & Electronics, Feb. '85, pp. 22-24, 84-85, 88

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Cleaning dirty copper coins. In: Jennings, Everyday Chemicals, p. 29

Copper plating. In: Jennings, Everyday Chemicals, p. 31

Determination of copper in an ore. In: Day, Quantitative, pp. 600-601

Electrogravimetric analysis of copper. In: Harris, Quantitative, p. 629

Electrolytic determination of copper. In: Day, Quantitative, pp. 621-623

Electron flow between iron and copper. In: Tocci, Chemistry, pp. 144-146

Electroplating using nickel and copper. In: Cobb, Chemically Active, pp. 96-100

Foiled again - electrochemistry experiment with nickel and copper.

Sci Teach, Sept. '85, pp. 27-29

In the balance: a stoichiometric experiment that works, using copper(I) iodide. Sci Teach, May '84, pp. 56-57

Reduction of copper oxide. Sci Teach, May '85, p. 72

Separation of copper and nickel by electrolysis. In: Day, Quantitative, pp. 623-624

Using flash bulbs, magnesium, copper and sulphuric acid to demonstrate electricity production. Sci Teach, Jan. '84, p. 32

Water and copper wire - experiments in expansion and contraction.

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- and Thermit process; and 4) exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15
- Growing crystals using copper sulphate, chrome alum, potassium nitrate or magnesium sulphate. In: Jennings, Everyday Chemicals, pp. 24-25
- Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63
- Thermal equilibrium in solutions - a study of $\text{Cu}^{2+}(\text{aq})$. Sci Teach, Feb. '84, p. 52

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- How good is your shampoo? - investigating pH, foam formation, dispersion ability, viscosity. In: Tocci, Chemistry, pp. 96-98
- Investigating toothpaste - abrasiveness, pH, foaming; mixing up some toothpaste; other cosmetics project suggestions. In: Tocci, Chemistry, pp. 102-106
- Investigations of hand lotions, cold or cleansing creams. In: Tocci, Chemistry, pp. 98-102

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- Coulometric titration of cyclohexene with bromine. In: Harris, Quantitative, p. 631

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- Keeping and using crayfish. Sci Teach, Nov. '85, pp. 45-46

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- Crystallization, including procedures for making rock candy sugar crystals, crystals on glass and crystals using sodium thiosulfate. Suggestions of other crystals to grow. In: Cobb, Chemically Active, pp. 29-41
- Crystallization - theory, practice and representative procedures. In: Wilcox, Experimental, pp. 68-73, 75-77
- Crystals: bath-time crystals, frosted glass, white needles, sugar candy, etc. In: Watson, Liquid, pp. 40-45
- Crystals in hot and cold water. In: Gardner, Kitchen, pp. 67-68
- Exploring crystal, and more about crystal. In: Science Activities, pp. 9-12
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Growing crystals. In: Gardner, Kitchen, pp. 69-71

Growing crystals, using copper sulphate, chrome alum, potassium nitrate or magnesium sulphate. In: Jennings, Everyday Chemicals, pp. 24-25

Heating a wire tells a lot about changes in the crystal structure of steel. Sci Am, May '84, pp. 148, 150-154

How can we grow crystals? In: Jacobson, Science, pp. 132-133

Making stalactites and stalagmites using Epsom salts. In: Challand, ...Earth Sciences, pp. 31, 82

Making sugar crystals. In: Scienceworks, p. 69

Minerals, crystals and rocks under the microscope. In: Curry, Under, pp. 80-98

Necklace of sugar crystals. In: Jennings, Everyday Chemicals, p. 24

Some brief and general information on atomic and nuclear physics including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

Topics and questions for investigation in chemistry - ascorbic acid, caffeine, milk, colloids, artificial sweeteners and crystallization. In: Tocci, Chemistry, pp. 30-31

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Determination of cyanide by the Liebig method. In: Day, Quantitative, pp. 577-578

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Experiments with and information about soaps and detergents. In: Tocci, Chemistry, pp. 107-116, 119-120

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Diels-Alder reaction, including general discussion and instructions for preparation of N-phenylmaleimide and adducts and maleic anhydride adducts. In: Wilcox, Experimental, pp. 390-395

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Diels-Alder reactions of benzoquinone. Preparations and reactions -- p-benzoquinone and dihydroxytryptcene. In: Wilcox, Experimental, pp. 396-401

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Diffraction and interference - single and multiple slits, interference in thin films, Pohl's experiment, Newton's Rings, Arago's White Spot, acoustical interference, etc. In: Hilton, Physics, pp. 78-83

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Testing diffusion. In: Challand, ...Life Sciences, pp. 29, 84

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Demonstrating absorption in the small intestine. In: Challand, ...Life Sciences, pp. 68, 87

The effects of saliva on starch. Sci Teach, Jan. '85, p. 54

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Diode tester. In: Greene, Quick-N-Easy, pp. 34-35

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Add-on zener diode regulator. In: Traister, 32 Electronic, pp. 149-153

The LED in motion - applications of the moving LED. In: Graf, One, pp. 102-110

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Do mouthwashes really kill bacteria? Mouthwashes and disinfectants are good subjects for science fair projects, but students must be careful to judge effectiveness correctly. Sci Teach, Sept. '84, pp. 34-40

Effectiveness of various disinfectants in controlling bacterial growth. In: Tocci, Chemistry, p. 117

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How far away is it? In: Jacobson, Science, pp. 196-198

Length, mass, time: models of fundamental units, micrometer and vernier calipers, slide rule and a vernier scale, time signals, Greenwich and sidereal times (brief information). In: Hilton, Physics, pp. 1-2

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- Glass solar still. In: Barling, John Barling's Solar, pp. 110-113
- Separating the parts in alcohol by distillation. Can several liquids be separated by fractional distillation? Background information on fractional distillation of petroleum. In: Tocci, Chemistry, pp. 135-140
- Simple and fractional distillation - theory and laboratory practice; representative distillations. In: Wilcox, Experimental, pp. 17-44
- Vacuum distillation - principles and laboratory practice, including representative distillations. In: Wilcox, Experimental, pp. 45-54
- Solar desalinizer. In: U.S. Department of Energy, Solar...Junior High, pp. 1-1 to 1-8
- Solar water cleaner. In: Scienceworks, p. 25
- Steam distillation - principles, lab practice and representative distillations. In: Wilcox, Experimental, pp. 55-61
- Sun energy can separate salt water into fresh water and salt - making a solar still. In: Adams, Catch, pp. 36-38

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- A whirling world. In: Cobb, How to, pp. 27-28

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- Egg power trick - demonstration of the supportive strength of an eggshell dome. In: Scienceworks, p. 13
- Gee, a dome! Building a geodesic dome. Sci Teach, Apr. '84, pp. 40, 45

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- Beats; Doppler effect; musical acoustics (brief information). In: Hilton, Physics, pp. 46-48

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- Titration of antacids to determine amount of acid neutralized by various commercial products. In: Day, Quantitative, pp. 571-572

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- Foaming colors: chemical color change demonstration using sodium hydroxide solution, Universal Indicator and dry ice. Sci Teach, Jan. '84, p. 64
- Magic with dry ice - approximately a dozen tricks and demonstrations using dry ice (solid carbon dioxide). In: McGill, Science, pp. 78-91

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- Preparation of Dulcin (p-ethoxyphenylurea) by the cyanate method and by the urea method. In: Wilcox, Experimental, pp. 334-336

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DYES AND DYEING

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In: Wilcox, Experimental, pp. 408-416

Extracting dyes from plants. In: Challand, ...Life Sciences, p. 18

Fabrics from fibers - investigating fibers: real or fake, making fibers, stretch test, coloring fabric, etc. In: Tocci, Chemistry, pp. 121-134

Making dyes. In: Jennings, Everyday Chemicals, pp. 26-27

Solvatochromic dyes - discussion and synthesis of merocyanin dyes.

In: Wilcox, Experimental, pp. 417-421

Tricky soap using some aniline dye. In: McGill, Science, pp. 66-67

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Testing your ears - hearing experiment. In: Challand, ...Life Sciences, pp. 71, 88

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Earth speedometer - simple way to determine length of the day. In: Scienceworks, p. 20

Explaining day and night using a flashlight and globe. In: Challand, ...Earth Sciences, p. 45

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Demonstrating eclipses with a light source and Styrofoam balls.

In: Challand, ...Earth Sciences, pp. 44, 83

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Classroom wildlife - bring the outdoors inside with this animal ecology board game. Sci Teach, Dec. '84, pp. 30-33

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- Calcium carbonate in egg shells. *Sci Teach*, Apr. '85, pp. 30-33
- Egging them on in chemistry - investigations using eggs. *Sci Teach*, Mar. '84, pp. 49-50
- The eggs that read - demonstration of sinking, floating and "swimming" eggs placed in water and other solutions of differing densities. In: McGill, Science, pp. 59-60
- Exploring osmosis using an egg; also general discussion of osmosis. In: Science Activities, pp. 41-44
- Low-energy breakfast - boiling eggs with the pot covered or uncovered; boiling eggs with the water boiling vigorously or gently. What is the difference in results? In: Scienceworks, p. 58
- Swimming egg. In: Watson, Liquid, p. 19
- Watching changes in chick embryos. In: Challand, ...Life Sciences, p. 57

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- Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

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- AC power failure alarm. In: Traister, Third, pp. 26-27
- Brownout monitor. In: Greene, Quick-N-Easy, pp. 28-29
- Building electric burglar alarms. In: Math, Wires, pp. 59-62
- Electricity-off signal. In: Greene, Easy, pp. 15-17
- High SWR alarm - high SWR in a transmitting antenna can damage modern radio equipment. In: Greene, Quick-N-Easy, pp. 56-57
- Mugger bugger - alarm for attaché case, shopping bag, purse, etc. In: Greene, Easy, pp. 20-21
- The Poweralert: a line voltage monitor - a power failure alarm. In: Graf, One, pp. 60-65
- Stand up alert - will tell when somebody gets up out of a chair. In: Greene, Quick-N-Easy, pp. 70-71
- Swimming pool monitor - sounds alarm when water reaches certain level. In: Greene, Quick-N-Easy, pp. 90-91
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- "Pokerino" game - an electrical construction. In: Math, Wires, pp. 64-66
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- Simple electromagnetic lock and a "combination" lock switch. In: Math, Wires, pp. 51-52
- "Steady hand" test of skill - an electric game. In: Math, Wires, pp. 63-64
- Tools of the electrical trade - types of electrical wire, switches that you can build, methods of joining wire, common work tools, etc. In: Math, Wires, pp. 31-36

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- Battery - an elementary general discussion, including schematic diagrams. In: Cooper, How Everyday, pp. 50-51
- Battery life tripler. In: Greene, Easy, pp. 30-31
- Cut-away diagrams of two common carbon-zinc dry cells and two multiple cell batteries. In: Math, Wires, pp. 10-11
- Dry-cells and multiple-cell batteries, including schematic diagrams. In: Math, Morse, pp. 7-8
- Home-made battery from copper and nickel coins and blotting paper soaked in salty water. In: Walters, Chemistry, p. 28
- Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84
- Make your own battery with a lemon; how a battery works. In: Kent, Introduction, p. 34
- Making an electric battery from a lemon. Experimenting with different citrus fruits and different metals. In: Tocci, Chemistry, pp. 142-143
- Making an electric battery using aluminum and either copper or lead, and using hydrochloric or sulfuric acid solutions. In: Tocci, Chemistry, p. 144
- Simple battery holder for D cells. In: Math, Wires, p. 16
- Simple diagram of a "wet" cell with copper and zinc plates. In: Math, Wires, p. 12
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- Ultra-simple lemon battery demonstrates Volta's discovery. In: Math, Wires, pp. 4-5
- What is the least expensive battery to use in an electronic device or toy? In: U.S. Department of Energy, Science, p. [19], and see also teacher's guide

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- Car battery checker. In: Greene, Easy, pp. 36-37
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- Electric bell using an electromagnet. In: Math, Wires, pp. 49-51
- Solid-state telephone bell: the Sonabell. In: Graf, One, pp. 51-59

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- Complete circuit experiment. In: Math, Morse, p. 6
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- Flow of charge; series/parallel electric circuits. In: Hilton, Physics, pp. 51-53
- Making a simple electric circuit; does electricity flow only through wires? In: Wilkes, Simple, p. 37
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Construction details for compass-type current detector. In: Math, Wires, pp. 3-4

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Detecting electric currents - how to make a galvanometer. In: Jacobson, Science, pp. 150-151

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Current electricity. In: Kent, Introduction, pp. 34-35

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Fuse telltale - lets you know when a fuse blows. In: Greene, Easy, pp. 77-79

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Insulator/conductor tester. In: Math, Morse, pp. 6-7

. ELECTRIC LAMPS AND LIGHTING

Battery light- light turns on easily, stays on for a few seconds and then turns itself off. In: Greene, Quick-N-Easy, p. 42

Convenience lighting - one light going off will cause another to come on. In: Greene, Easy, pp. 52-53

Electric light bulb - drawing of an incandescent bulb. In: Kent, Introduction, p. 35

How does a flashlight work? What is wrong with the flashlight?

In: Jacobson, Science, pp. 154-155

How many 25-watt bulbs equal the light output of one 100-watt bulb?

Uses light meter in previous experiment, pp. 9-10. In: U.S.

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How much energy is saved when a dimmer switch is used with a 100-watt bulb? In: U.S. Department of Energy, Science, pp. [13-14], and see also teacher's guide

How much light does a bulb give off from a distance of one foot compared to a distance of three feet? Includes instructions on making a light

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- Night light - circuit holds light on for a couple of minutes. In: Greene, Quick-N-Easy, pp. 83-85
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- Prevent light burnout - device allows slow buildup of electricity through bulb's filament. In: Greene, Easy, p. 80
- Working with electric lamps, including constructing an emergency lighting system. In: Math, Wires, pp. 37-45

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- Analog sensors for personal computers - how personal computer with analog to digital converter is able to expand capabilities of simple circuit: light meters, etc. Computers & Electronics, Feb '84, pp. 82, 84-88, 90
- Computer controlled light meter. Computers & Electronics, Aug. '84, pp. 18, 21-22, 76-77
- Field strength meter. In: Greene, Easy, pp. 50-51
- Leakage detector - tester detects potentially lethal electricity leaks in, e.g., household appliances. In: Greene, Easy, pp. 90-91

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- Building a demonstration electric motor. In: Math, Wires, pp. 53-58
- Current carrying conductors and magnetic fields; electric motors. In: Hilton, Physics, pp. 58-60
- DC motor speed controller (article in Computers & Electronics, Oct. '83, pp. 57-): correction. Computers & Electronics, Jan. '84, p. 7
- Electric motors: make an electric motor; what is happening? In: Kent, Introduction, p. 38
- How can we build an electric motor? In: Jacobson, Science, pp. 157-159
- Motor on/off controller. In: Greene, Easy, pp. 56-57
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- Homemade electromagnetic relay, and "latching relay" circuit. In: Math, Wires, pp. 48-50

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- Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84

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- Model railroad semaphore signal and simple track switch using an electromagnet. In: Math, Wires, pp. 47-48
- Motor on/off controller. In: Greene, Easy, pp. 56-57
- Siren (or alarm or light) on-off switch. In: Greene, Easy, pp. 32-33
- Tone turn on - device responds to a single tone. In: Greene, Easy, pp. 48-49
- Tools of the electrical trade - types of electrical wire, switches that

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you can build, methods of joining wire, common work tools, etc.
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Transformers, including Tesla coil. In: Hilton, Physics, pp. 64-65

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Demonstration of Faraday's experiment that electricity can be converted to magnetism and vice versa. In: Math, Wires, pp. 5-6

Electricity from salt and lemons. In: Jacobson, Science, pp. 152-153

Exploring electricity, and more about electricity. In: Science Activities, pp. 1-4

General discussion of kinds of electricity, and making and using a simple galvanometer to detect electric currents. In: Cobb, Chemically Active, pp. 77-87

Home electricity computer program - works out how much electricity various home appliances use. Program given with necessary modifications for various computer models. In: Kent, Introduction, pp. 42-45

Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84

Leakage detector - tester detects potentially lethal electricity leaks in, e.g., household appliances. In: Greene, Easy, pp. 90-91

Using a magnet to generate electricity. In: Jacobson, Science, p. 156

Using flash bulbs, magnesium, copper and sulphuric acid to demonstrate electricity production. Sci Teach, Jan. '84, p. 32

ELECTROCHEMISTRY

Electrolytic/galvanic cell demonstration - hydrogen electrode.

Sci Teach, Apr. '84, pp. 66-67

Foiled again - electrochemistry experiment with nickel and copper.

Sci Teach, Sept. '85, pp. 27-29

Weak and strong acids and the electrochemical series - some general information. In: Walters, Chemistry, pp. 18-19

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Electrolytic determination of copper. In: Day, Quantitative, pp. 621-623

Making chlorine by electrolysis of concentrated solution of sodium chloride; hydrogen also produced. In: Walters, Chemistry, p. 29

Separation of copper and nickel by electrolysis. In: Day, Quantitative, pp. 623-624

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Electrolytes and the structure of atoms - a brief simple discussion.

In: Cobb, Chemically Active, pp. 92-94

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ELECTROLYTIC CELL

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Demonstration of Faraday's experiment that electricity can be converted to magnetism and vice versa. In: Math, Wires, pp. 5-6

Generator experiment using coiled wire, bar magnet and compass.

In: Math, Morse, pp. 9-10

Some brief and general information on atomic and nuclear physics including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

ELECTROMAGNETS

Build an electromagnet and experiment with it. In: Ardley, Exploring, pp. 26-29

Electromagnetic sounder similar to first telegraph sounder. In: Math, Wires, pp. 46-47

Electromagnets: make an electromagnet. In: Kent, Introduction, p. 37

Making an electromagnet. How to change the poles of an electromagnet.

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Model railroad semaphore signal and simple track switch using an electromagnet. In: Math, Wires, pp. 47-48

Simple electromagnet. In: Math, Wires, pp. 46-47

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Appliance/computer hookup. In: Greene, Easy, p. 76

Aquarium leakage monitor. In: Greene, Quick-N-Easy, pp. 48-49

An audible turn signal. In: Traister, Third, pp. 8-9

Body bug. In: Greene, Quick-N-Easy, p. 72

Breeze meter - electronic meter can read changes in barometric pressure and humidity by testing conductivity of air. In: Greene, Easy, pp. 58-59

Convenience lighting - one light going off will cause another to come on. In: Greene, Easy, pp. 52-53

Digital counter demonstrator. In: Hawkins, Digital, pp. 88-101

A do-nothing box - gives an entertaining display of lights. In: Traister, Third, pp. 10-12

Earphone amplifier for IC projects. In: Traister, Second, pp. 61-63

Electronic circuits and applications: light dimmers, electronic switches, dielectric heaters. In: Traister, Third, pp. 66-68

Electronic metronome. In: Greene, Quick-N-Easy, pp. 38-39

Electronic project construction procedures and enclosures. In: Hawkins, Digital, pp. 54-59

FET electrometer. Computers & Electronics, Jan. '84, p. 98

Fixed-output microphone mixer. In: Traister, Second, pp. 55-60

Grass music - electronic project involving pumping music into the ends of your lawn and picking the sounds up again at other places.

In: Greene, Easy, pp. 66-67

Induction telephone pickup - amplified telephone conversations or telephone bells; listen to pocket calculators; listen to magnetized wire; detect magnetic field leakage; etc. In: Graf, Exploring, pp. 31-54

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- Integrated-circuit pocket organ. In: Traister, Third, pp. 13-14
- LED lamp exchange - get digital LED readout from four pilot lamps.
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- Leakage detector - tester detects potentially lethal electricity leaks in, e.g., household appliances. In: Greene, Easy, pp. 90-91
- Light-sensitive audio oscillator: the Sonalight changes light intensity into sound. In: Graf, One, pp. 66-78
- Mini recounter. In: Greene, Quick-N-Easy, pp. 66-67
- Modular decade counter. In: Hawkins, Digital, pp. 102-119
- Moisture detection circuits. Computers & Electronics, Jan. '84, p. 96
- Music stopper - making stereo's manual turntable into an automatic shut-off system. In: Greene, Quick-N-Easy, pp. 50-51
- On off on off on off - circuit which will "turn on a relay, briefly, repeatedly, every minute or so, forever,...". In: Greene, Quick-N-Easy, pp. 30-31
- Optoelectronic digitizer. Computers & Electronics, Dec. '84, pp. 22-23, 26, 28
- Party starter - gadget counts. In: Greene, Quick-N-Easy, pp. 20-21
- Phaser sound effect. In: Greene, Quick-N-Easy, pp. 32-33
- A pipe and cable detector - a simple metal locator. In: Traister, Third, pp. 52-54
- A pocket electronic color organ. In: Traister, Third, pp. 15-16
- Practice Morse code keyer. In: Greene, Quick-N-Easy, pp. 93-95
- Prevent light burnout - device allows slow buildup of electricity through bulb's filament. In: Greene, Easy, p. 80
- Pulse motor control. In: Greene, Quick-N-Easy, pp. 24-25
- Pulse-transmitting metronome circuit - experiment with a short-range transmitter. In: Traister, Second, pp. 38-42
- Robot lingo - electronic device allowing you to create sound effects.
In: Greene, Quick-N-Easy, pp. 78-79
- Semiautomatic code keyer. In: Hawkins, Digital, pp. 144-148
- Silence TV commercials. In: Greene, Quick-N-Easy, pp. 52-53
- Single-channel light organ. In: Traister, Second, pp. 43-48
- Soil moisture monitor. In: Greene, Easy, pp. 24-25
- Solar clock. In: Greene, Easy, pp. 54-55
- Solar flasher. In: Greene, Easy, pp. 62-63
- Sound combiner - mix four audio sources into one. In: Greene, Easy, p. 84
- Sound-operated light control. In: Traister, Third, pp. 41-43
- Sound unlocker. In: Greene, Easy, pp. 64-65
- Stand up alert - will tell when somebody gets up out of a chair.
In: Greene, Quick-N-Easy, pp. 70-71
- Sun spotter - electronic device with flashing lights. In: Greene, Quick-N-Easy, pp. 76-77
- Transistorized ignition system. In: Traister, Third, pp. 24-25
- Water watcher - electronic detector can be used in construction of a rain gauge, wet-basement monitor, water-level controller, etc. In: Greene, Easy, pp. 88-89
- Your phone is ringing - remote bell for phone system. In: Greene, Easy, pp. 74-75

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ELECTRONIC APPARATUS AND APPLIANCES - TESTING

- Alternator analyzer. In: Greene, Easy, p. 68
- An audio continuity and voltage tester: the Testone. In: Graf, One, pp. 95-101
- Capacitor measurer. In: Greene, Quick-N-Easy, pp. 62-63
- Crystal tester. In: Greene, Easy, pp. 46-47
- Diode tester. In: Greene, Quick-N-Easy, pp. 34-35
- Electronic testing: effects of self-heating, influence of mechanical troubles, calibration errors, instrument repairs, field-effect transistor voltmeter, logic probe transistor sorter/tester. In: Traister, Third, pp. 28-40
- Fuse telltale - lets you know when a fuse blows. In: Greene, Easy, pp. 77-79
- Polarity-sensing continuity tester using LED's. In: Graf, One, pp. 79-88
- Radio tester. In: Greene, Easy, pp. 38-39
- Super simple tester - an electronic type of ohmmeter. In: Traister, Third, pp. 46-47
- Wide-resistance-range audio continuity tester; additional uses to detect water seepage, liquid level and rain. In: Graf, One, pp. 122-128

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- Analog sensors for personal computers - how personal computer with analog to digital converter is able to expand capabilities of simple circuit: light meters, etc. Computers & Electronics, Feb. '84, pp. 82, 84-88, 90
- Building printed circuits, including soldering instructions. In: Hawkins, Digital, pp. 9-53
- DC input circuit for an oscilloscope. In: Traister, Second, pp. 78-79
- Fixed-output microphone mixer. In: Traister, Second, pp. 55-60
- High-to-low microphone-impedance converter. In: Traister, Second, pp. 49-54
- Working with integrated circuits. In: Hawkins, Digital, pp. 60-69

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- An audio continuity and voltage tester: the Testone. In: Graf, One, pp. 95-101
- Breadboard with power supply. In: Hawkins, Digital, pp. 120-124
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- Digital IC tester. In: Hawkins, Digital, pp. 149-157
- Digital logic probe. In: Hawkins, Digital, pp. 76-80
- Large digital display with breadboard. In: Hawkins, Digital, pp. 125-131
- Mini-breadboard with shift register. In: Hawkins, Digital, pp. 158-169
- Polarity-sensing continuity tester using LED's. In: Graf, One, pp. 79-88

ELECTRONIC DRAFTING

- Computer aided drafting. Computers & Electronics, June '84, pp. 14, 20-21, 24, 105; and July '84, pp. 74-77, 97

ELECTRONIC GAMES

- Coffee table game. In: Greene, Quick-N-Easy, pp. 59-61
- Mini recounter. In: Greene, Quick-N-Easy, pp. 66-67
- Party starter - gadget counts. In: Greene, Quick-N-Easy, pp. 20-21
- Reflex tester. In: Greene, Quick-N-Easy, pp. 15-17

ELECTRONICS

- Building electronics projects, buying parts, substituting parts, safety, soldering tips, handling CMOS IC's, powering your projects - some general comments. In: Greene, Easy, pp. 6-14, 95-96
- Building projects, buying parts, parts suppliers, substituting parts, a bit on safety, soldering, handling CMOS IC's, etc. In: Greene, Quick-N-Easy, pp. 6-14
- Construction assembly hints for electronics projects. In: Graf, One, pp. 9-24

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- Some brief and general information on atomic and nuclear physics including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

ELECTROPLATING

- Brief suggestions for investigations in the areas of petroleum chemistry, water electrolysis, electroplating and recombinant DNA. In: Tocci, Chemistry, pp. 148-149
- Copper plating. In: Jennings, Everyday Chemicals, p. 31
- Electrogravimetric analysis of copper. In: Harris, Quantitative, p. 629
- Electron flow between iron and copper. In: Tocci, Chemistry, pp. 144-146
- Electroplating. In: Walters, Chemistry, p. 29
- Electroplating using nickel and copper. In: Cobb, Chemically Active, pp. 96-100

ELECTROSCOPE

- Emanation electroscope. In: Hilton, Physics, p. 100
- Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84
- Making a paper electroscope. In: Jacobson, Science, pp. 148-149

- ELECTROSTATICS

- Bending water. In: Gardner, Kitchen, pp. 40-41
- Crackles and sparks. In: Wilkes, Simple, p. 36
- FET electrometer. Computers & Electronics, Jan. '84, p. 98
- Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84
- Magic wand - electrostatics demonstrations involving charged comb, ping pong ball and bending stream of water. In: Scienceworks, pp. 10-11
- Static electricity. In: Kent, Introduction, pp. 32-33
- Static electricity - electroscopes, electrophorus and accessories, Pasco electrostatics demonstration equipment, etc. (brief information). In: Hilton, Physics, pp. 48-50

ELEVATORS

ELEVATORS

Elevators and escalators. In: Cooper, How Everyday, pp. 16-17

ELLIPSE

Elliptical experimenting. Sci Teach, Nov. '84, p. 56

Kepler's Laws: constructing an ellipse, elliptical path from air table puck, escape velocity (brief information). In: Hilton, Physics, pp. 19-20

ELODEA

Watching movement in living cells - Elodea is a good choice. In: Challand, ...Life Sciences, p. 34

EMBRYOLOGY

Watching changes in chick embryos. In: Challand, ...Life Sciences, p. 57

EMULSIONS

Cleaning your skin - demonstration using water, soap, oil and soil.

In: Challand, ...Life Sciences, p. 80

Curd cheese - made by splitting up an emulsion. In: Watson, Liquid, pp. 24-25

Emulsifying fats. In: Challand, ...Life Sciences, pp. 65, 87

Investigations of hand lotions, cold or cleansing creams. In: Tocci, Chemistry, pp. 98-102

Making an emulsion found in every kitchen. In: Tocci, Chemistry, pp. 22-23

Milky emulsion of cooking oil and water; salad dressing as an emulsion; butter as an emulsion. In: Watson, Liquid, pp. 23-24

ENDANGERED SPECIES

Locally endangered species projects. In: Heintzelman, Birdwatcher's, pp. 203-222

ENERGY CONSERVATION

Conservation of energy - tracks, pendulums, springs (brief information).

In: Hilton, Physics, pp. 13-15

Darda's Demon and the first law of thermodynamics. Sci Teach, May '84, pp. 53-55

How much energy is saved when a dimmer switch is used with a 100-watt bulb? In: U.S. Department of Energy, Science, pp. [13-14], and see also teacher's guide

How much farther will a car that's twice as heavy go when the same force is applied? Experiment has a connection with gasoline consumption. In: U.S. Department of Energy, Science, pp. [1-2], and also see teacher's guide

ENGINES

Experiments with the external combustion fluidyne engine, which has liquid pistons. Sci Am, Apr. '85, pp. 140-144, 146

Thermodynamics and heat engines (brief information). In: Hilton, Physics, pp. 32-33

ENZYMES

The action of liver enzyme and yeast enzyme on hydrogen peroxide.

In: Watson, Liquid, pp. 36-37

Experimenting with an enzyme. In: Challand, ...Life Sciences, pp. 59, 86

ENZYMES (continued)

- Lab experiment demonstrating effect of enzyme catalase on decomposition of hydrogen peroxide - this column provides two modifications to the common experiment, one regarding extraction of the enzyme from liver and the other involving a simple manometer. *Sci Teach*, Jan. '84, p. 62
- Watch an enzyme at work - iodine test on starch solution and on starch and saliva mixture. In: Chisholm, Introduction, p. 25
- Yeast enzyme for making bread and in reaction with fruit juice. In: Watson, Liquid, pp. 38-39

EQUILIBRIUM, CHEMICAL

See CHEMICAL EQUILIBRIUM

EROSION

- Conserving topsoil - an erosion demonstration. In: Challand, ...Earth Sciences, pp. 13, 81
- Demonstrating wave erosion. In: Challand, ...Earth Sciences, p. 32
- Exploring soil erosion, and more about soil erosion. In: Science Activities, pp. 13-16
- Glacier model to show formation of eskers, kames, and moraines. In: Challand, ...Earth Sciences, pp. 16-17

ESCALATORS

- Elevators and escalators. In: Cooper, How Everyday, pp. 16-17

ESKERS

See GLACIERS

ESTERS (CHEMISTRY)

- Esters: general discussion of esterification and saponification, fats and fatty oils, detergents and wetting agents; instructions for esterification of acetic acid and preparation of methyl benzoate. In: Wilcox, Experimental, pp. 295-302
- Experimenting with and detecting preservatives used in bread - propionates; making other esters. In: Tocci, Chemistry, pp. 54-57
- Extremely sensitive test for esters - hydroxamate test. In: Wilcox, Experimental, pp. 145-147
- p-Aminobenzoic acid (PABA) and esters: preparation of PABA and esterification of PABA. In: Wilcox, Experimental, pp. 336-338
- The 2,4-dinitrophenylhydrazine test. In: Wilcox, Experimental, p. 143

ETHYLENEDIAMINETETRAACETIC ACID (EDTA)

- Preparation and standardization of sodium-EDTA solution. In: Day, Quantitative, pp. 578-579

EVAPORATION

- Cool it! -- demonstration of the cooling effect of evaporation. In: Scienceworks, p. 27
- Cooling effect of evaporation, using wet and dry thermometers. In: Arnov, Water, pp. 35-37
- Demonstration of relative rates of evaporation of water and rubbing alcohol. In: Arnov, Water, pp. 54-55
- Discovering factors related to evaporation. In: Challand, ...Earth Sciences, pp. 76, 87
- "Drying the ink" -- rates of evaporation of liquids. In: Zubrowski, Ball-Point Pens, pp. 30-32

EVAPORATION

EVAPORATION (continued)

- Evaporation and condensation; experiment with a teakettle. In: Arnov, Water, pp. 31-34
- Fog and cloud chamber - use of 1.5L clear glass jugs. Sci Teach, Feb. '84, p. 53
- Nutrients in lake or ocean water: an evaporation experiment to demonstrate dissolved mineral residue. In: Arnov, Water, pp. 22-23
- Vanishing water - various simple experiments. In: Wilkes, Simple, pp. 10-11

EXERCISE

- How does exercise affect the breathing rate? In: Jacobson, Science, p. 114

EXPANSION OF LIQUIDS

- Expansion in metals and liquids (very brief information). In: Hilton, Physics, p. 30
- Hot sips - experimenting with bringing together water of different temperatures. In: Scienceworks, p. 42
- Water and copper wire - experiments in expansion and contraction. In: Arnov, Water, pp. 14-17

EXPANSION OF SOLIDS

- Expansion in metals and liquids (very brief information). In: Hilton, Physics, p. 30
- Investigation of how expansion and contraction of solids can be demonstrated. In: Jacobson, Science, pp. 71-72
- Never fail lid remover - using hot water. In: Scienceworks, p. 54
- Water and copper wire - experiments in expansion and contraction. In: Arnov, Water, pp. 14-17

EXPERIMENTATION

- See SCIENCE - METHODOLOGY

EYE

- Eye and face protection in chemistry lab - demonstrations with a mannequin. Sci Teach, Dec. '84, p. 49
- Figuring out the job of the iris. In: Challand, ...Life Sciences, pp. 73, 88
- How can the effects on perception of the loss of sight in one eye be demonstrated? In: Jacobson, Science, p. 103

FAT

- Emulsifying fats. In: Challand, ...Life Sciences, pp. 65, 87
- The fat and protein content of milk. In: Tocci, Chemistry, pp. 18-21
- How much meat in a hot dog - testing for fat and water. Sci Teach, Mar. '84, p. 62
- Testing for fats - elementary test using a brown paper bag. In: Challand, ...Life Sciences, p. 68

FERMENTATION

- Biosynthesis of alcohols - general discussion, and instructions for production of ethanol by fermentation. In: Wilcox, Experimental, pp. 428-431

FERMENTATION (continued)

Fermenting some fruit juice and testing the gas produced with limewater.
In: Chisholm, Introduction, p. 31

FERROCENES

Metallocenes, including instructions for preparation of ferrocene and acetylferrocene. In: Wilcox, Experimental, pp. 402-407

FERROMAGNETISM

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FERTILIZERS AND MANURES

Making your own compost; also compost the chemical way; discussion of fertilizers, and detection of ammonia if present in commercial fertilizer. In: Tocci, Chemistry, pp. 172-177

FIBER OPTICS

Amplitude-modulated fiber optics transmitter. In: Boyd, Fiber, pp. 140-147
Amplitude-modulation fiber-optics receiver. In: Boyd, Fiber, pp. 127-139
Basic digital transmission of data. In: Boyd, Fiber, pp. 108-111
Basic pulse-frequency modulation for use with fiber-optics systems.
In: Boyd, Fiber, pp. 115-118
Experiment involving getting acquainted with a "light pipe". In: Boyd, Fiber, pp. 77-86
Fiber-optics light-pen cable. In: Boyd, Fiber, pp. 153-157
Fiber-optics light transmission cable. In: Boyd, Fiber, pp. 148-152
Fundamentals of fiber optics - introduction; basic principles; where it all started; the 'nuts and bolts'; basic principles of glass fibers; simple systems. In: Boyd, Fiber, pp. 15-73
Improved modulator. In: Boyd, Fiber, pp. 98-103
LED-driven fiber-optic system. In: Boyd, Fiber, pp. 104-107
Light-beam voice and music modulator. In: Boyd, Fiber, pp. 87-97
Multitone modulation of digital transmission - fiber optics pulse transmission system. In: Boyd, Fiber, pp. 112-114
Pulse-frequency modulation: to demonstrate "successful transmission and reception of digital pulse-frequency voice modulation over a fiber-optic link". In: Boyd, Fiber, pp. 119-123
Single-fiber passive light pen. In: Boyd, Fiber, pp. 158-162
Variety of specific pieces of information regarding fiber optics - caution note; light; obtaining experimental fiber-optics supplies; sources for fiber-optics systems, connectors, and components; building circuits; terminating and coupling optical fibers; examples of manufactured products; miscellaneous information; advantages of fiber optics; glossary and bibliography. In: Boyd, Fiber, pp. 165-215

FIBERS

Fabrics from fibers - investigating fibers: real or fake, making fibers, stretch test, coloring fabric, etc. In: Tocci, Chemistry, pp. 121-134
Laying a rope; natural plant cordage; fiber flame tests; making your own glue, etc. In: Cobb, Secret, pp. 31-45
Testing fibers by burning. In: Cobb, Chemically Active, p. 138

FILTERS AND FILTRATION

FILTERS AND FILTRATION

See also ELECTRIC FILTERS

Filtering - experiments with solutions and with liquids containing undissolved material. In: Gardner, Kitchen, pp. 29-30

FINGERPRINTS

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Making prints of your fingers. In: Challand, ...Life Sciences, p. 81
Taking fingerprints; what are fingerprints? In: Scienceworks, pp. 48-49

FINGERS

Exploring genetics: experimenting with a sample group of humans regarding tongue rolling, folding; earlobes; hitchhiker's thumb; etc.; also general information on genetics. In: Science Activities, pp. 49-52

FIRE

A substitute for charcoal, using ethanol and calcium acetate. In: Tocci, Chemistry, pp. 160-161

FIRE EXTINCTION

Fire extinguisher gas using vinegar and baking soda. In: Gardner, Kitchen, pp. 36-37

Model fire extinguisher. In: Jennings, Everyday Chemicals, p. 13

FISHES

See GUPPIES

FLAME TESTING (CHEMISTRY)

An alternate [i.e., alternative] method for flame tests. Sci Teach, Mar. '84, p. 61

The flame test. In: Cobb, Chemically Active, pp. 122-124

Flames and ion excitation - flame tests using specially made glass pipettes. Sci Teach, Jan. '85, p. 52

FLASHLIGHT

How does a flashlight work? What is wrong with the flashlight? In: Jacobson, Science, pp. 154-155

FLOUR

White powder chemistry: distinguishing among some common kitchen powders - starch, flour, sugar, salt and baking soda. Using some elementary observational methods. In: Gardner, Kitchen, pp. 115-119

FLOW CHARTS

Tracking what things are attracted by a magnet by using a flow chart. In: Fitzpatrick, Magnets, p. 9

FLOWERS

Growing flowers from vegetables. In: Challand, ...Life Sciences, p. 19

Striped celery, changing colors of flowers, and preserving leaves through capillarity using glycerine. In: Watson, Liquid, pp. 8-11

Studying flowers - investigating main parts of a flower. In: Jacobson, Science, pp. 18-19

FLOWERS (continued)

Wild garden and special herb garden; how to press and identify plants; photographing flowers; projects with wild flowers; etc. In: Brown, Investigating, pp. 223-241

FLUID DYNAMICS

Calculating the flow speed of streams and rivers. In: Challand, ...Earth Sciences, p. 26

What forces shape the behavior of water as a drop meanders down a windowpane? Sci Am, Sept. '85, pp. 138-144

FLUIDYNE ENGINE

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FLUORESCENCE

Lighter side of chemistry - photochemistry: ferrioxalate, using titanium to make a photoelectrochemical cell, fluorescence. Sci Teach, Dec. '84, pp. 25-28

FOG

Fog and cloud chamber - use of 1.5L clear glass jugs. Sci Teach, Feb. '84, p. 53

Making fog. In: Challand, ...Earth Sciences, pp. 68, 86

FOOD

Wild marshmallows: wild food plants grow outside school's doors.

Harvest some for a biology course. Sci Teach, May '84, pp. 46-52

FOOD - ANALYSIS

Fats and margarines: what are polyunsaturates? Testing using iodine and an organic solvent. In: Chisholm, Introduction, p. 35

How can food tests be conducted? In: Jacobson, Science, pp. 115-116

How much meat in a hot dog - testing for fat and water. Sci Teach, Mar. '84, p. 62

Mineral content of milk. In: Tocci, Chemistry, pp. 16-17

Test for starch. In: Cobb, Chemically Active, p. 131

Test for sugar. In: Cobb, Chemically Active, pp. 128-131

Test for vitamin C. In: Cobb, Chemically Active, pp. 131-135

FOOD - DRYING

Food dryer using solar energy. In: Barling, John Barling's Solar, pp. 84-87

FOOD - FLAVORS

Food that's almost the real thing - foods made to taste much like something else. In: Cobb, How to, pp. 48-51

FOOD - PRESERVATION

Checking dried fruit and other foods for sulfur dioxide used as a preservative. In: Tocci, Chemistry, pp. 57-58

Experimenting with and detecting preservatives used in bread - propionates; making other esters. In: Tocci, Chemistry, pp. 54-57

Vitamin C as a preservative. In: Tocci, Chemistry, pp. 53-54

FOOD ADDITIVES

FOOD ADDITIVES

- Checking dried fruit and other foods for sulfur dioxide used as a preservative. In: Tocci, Chemistry, pp. 57-58
- Food additives that fortify - testing for iron in foods. In: Tocci, Chemistry, pp. 58-60
- Preparing natural food colorings from various fruits and vegetables. In: Tocci, Chemistry, p. 66
- Topics and questions for investigation in chemistry - ascorbic acid, caffeine, milk, colloids, artificial sweeteners and crystallization. In: Tocci, Chemistry, pp. 30-31
- Vitamin C as a preservative. In: Tocci, Chemistry, pp. 53-54

FOOD CHAIN (ECOLOGY)

- Setting up a food chain, beginning with fresh-water algae. In: Challand, ...Life Sciences, p. 55

FOOT

- Making prints of your feet. In: Challand, ...Life Sciences, p. 80

FORCE AND ENERGY

- Amazing rolling can - demonstration of storage and release of energy (potential and kinetic energy). In: Scienceworks, pp. 14-15
- Bounces and springs; testing for bounce; energy from rubber and springs; creeping toys, etc. In: Wilkes, Simple, pp. 30-31
- Egg power trick - demonstration of the supportive strength of an eggshell dome. In: Scienceworks, p. 13
- Energy transfer demonstration with marbles. Sci Teach, Nov. '85, pp. 47-48
- How much farther will a car that's twice as heavy go when the same force is applied? Experiment has a connection with gasoline consumption. In: U.S. Department of Energy, Science, pp. [1-2], and also teacher's guide
- Newton's Second Law of Motion: two acceleration experiments; the Atwood machine (brief information). In: Hilton, Physics, pp. 6-7
- Newton's Third Law of Motion: forces exist in pairs, train on a circular track, mass under spring tension, falling water, etc. (brief information). In: Hilton, Physics, pp. 7-8
- Ramp magic - lifting something heavy using a ramp. In: Scienceworks, p. 55
- Static equilibrium: pulleys add a new direction to experiments that demonstrate forces. Sci Teach, Dec. '85, pp. 20-23
- Strongman's secret - using rope and broomsticks to demonstrate work advantage to be gained by combining materials in a certain way. In: Scienceworks, p. 9

FORMALDEHYDE

- Home is where the formaldehyde is - correction to article in Sci Teach, Dec. '83, pp. 26, 28-29. Sci Teach, Mar. '84, p. 28

FOSSILS

- Discovering how fossils were made - making types of "fossils" with cement, etc. In: Challand, ...Earth Sciences, p. 25
- How to collect fossils; classification of fossil forms; cataloging, preparing, and displaying your fossils. In: Casanova, Illustrated Guide, pp. 33-67, 103-135

FOUCAULT'S PENDULUM

Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

FRACTIONAL DISTILLATION

See DISTILLATION

FREEZING

Ice lollipop demonstration shows that water expands when it freezes.

In: Watson, Liquid, p. 15

The physics of grandmother's peerless homemade ice cream. Sci Am,

Apr. '84, pp. 150-154 and comment Oct. '84, p. 8

What happens when water freezes - investigation. In: Jacobson, Science, pp. 43-44

FREEZING POINTS

Discovering factors that affect the freezing point of liquids.

In: Challand, ...Earth Sciences, pp. 62, 85

Experimenting with lowering the freezing point of water by adding solutes. In: Tocci, Chemistry, p. 142

Ice fishing - demonstration that addition of salt lowers freezing point of water. In: Scienceworks, p. 4

Water with and without added salt - freezing point determinations.

In: Tocci, Chemistry, pp. 3-5

FRESNEL LENS

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FRICTION

Coefficient of friction; apparatus for demonstrations of various types of friction (brief information). In: Hilton, Physics, p. 10

How does the force of friction change? In: Jacobson, Science, pp. 179-180

Pedal power - effect of degree of inflation of bike tires on friction.

In: Scienceworks, p. 57

Science friction - friction demonstration using a ruler. In: Scienceworks, p. 16

Very simple rolling demonstration of friction and acceleration.

In: Kent, Introduction, p. 28

FRIEDEL-CRAFTS REACTIONS

Friedel-Crafts reactions - discussions of alkylation and acylation, including instructions for preparation of 4-acetylbiphenyl. In: Wilcox, Experimental, pp. 312-317

Hydrocarbon testing - permanganate test (Baeyer test), bromine test, Friedel-Crafts test. In: Wilcox, Experimental, pp. 150-153

FROGS

Following the life cycle of a frog. In: Challand, ...Life Sciences, pp. 56-57

FRUIT

FRUIT

Checking dried fruit and other foods for sulfur dioxide used as a preservative. In: Tocci, Chemistry, pp. 57-58

Specifics of propagation: fruits & nuts; trees, shrubs, vines; herbaceous plants. In: Hill, Secrets, pp. 119-156

Yeast enzyme for making bread and in reaction with fruit juice. In: Watson, Liquid, pp. 38-39

FRUIT FLIES

Raising generations of fruit flies. In: Challand, ...Life Sciences, pp. 48-49

FUNCTIONAL GROUPS (CHEMISTRY)

See CHEMISTRY, ANALYTIC - QUALITATIVE

FUNGI

See also MUSHROOMS

Collecting fungi. In: Challand, ...Life Sciences, pp. 12-13

FUSION, LATENT HEAT OF

The heat to melt ice. In: Gardner, Kitchen, pp. 59-61

GALAXIES

A determination of the Hubble constant (data given). In: Culver, Introduction, pp. 147-153

The distance to the galaxy M87 (data given). In: Culver, Introduction, pp. 132-137

Investigating some of the basic properties of the Milky Way (data given). In: Culver, Introduction, pp. 125-131

The rotation and mass of the Andromeda galaxy M31. In: Culver, Introduction, pp. 138-146

GALVANIC CELL

See ELECTROCHEMISTRY

GALVANOMETER

Detecting electric currents - how to make a galvanometer. In: Jacobson, Science, pp. 150-151

General discussion of kinds of electricity, and making and using a simple galvanometer to detect electric currents. In: Cobb, Chemically Active, pp. 77-87

Investigating electricity, including checking out static electricity with various materials, making an electroscope, making a current detector or galvanometer, making your own wet-cell battery, investigating an electric circuit and electric resistance. In: Cobb, Secret, pp. 66-84

GAMES

Farmer/river puzzle - an electrical construction. In: Math, Wires, pp. 67-70

"Pokerino" game - an electrical construction. In: Math, Wires, pp. 64-66

GAMES (continued)

- Reaction testing device - an electrical construction. In: Math, Wires, pp. 66-69
- "Steady hand" test of skill - an electric game. In: Math, Wires, pp. 63-64
- Success in racquetball is enhanced by knowing the physics of the collision of the ball with the wall. Sci Am, Sept. '84, pp. 215, 219-220, 222, 227, 230

GARDENS

See also HYDROPONICS

- Growing flowers from vegetables. In: Challand, ...Life Sciences, p. 19
- Growing tree seeds. In: Challand, ...Life Sciences, p. 21
- The home nursery: equipment, propagation media, containers, artificial climates, the potting shed, greenhouses, container growing, chemicals, collecting native plants. In: Hill, Secrets, pp. 3-25
- Plant propagation: dividing plants, layering (tip, compound, stool and air layers), cuttings, grafting, bud grafting, tissue culture. In: Hill, Secrets, pp. 52-115
- Planting a vegetable garden. In: Challand, ...Life Sciences, pp. 42-43
- Seeds: annuals and perennials, buying seeds, growing bedding plants from seed, planting seeds, transplanting, stratification of seeds, dormancy, pollination, experiments with seeds, etc. In: Hill, Secrets, pp. 26-51
- Specifics of propagation: fruits and nuts; trees, shrubs, and vines; herbaceous plants. In: Hill, Secrets, pp. 119-156
- Wild garden and special herb garden; how to press and identify plants; photographing flowers; projects with wild flowers; etc. In: Brown, Investigating, pp. 223-241

GAS CHROMATOGRAPHY

See CHROMATOGRAPHIC ANALYSIS

GASES

- Chemical reaction indicated by production of a gas - experiment with hydrogen peroxide and manganese dioxide, and other experiments and observations. In: Cobb, Chemically Active, pp. 51-54
- Cooling a gas. In: Gardner, Kitchen, pp. 43-44
- Demonstrations to show that air moves, heat causes air to expand, air contains moisture, that warm air holds more moisture than cold air, and that air holds some things up. In: U.S. Department of Transportation, Aviation, pp. 5-9
- Do balloons leak? In: Gardner, Kitchen, pp. 106-107
- Do gases dissolve in liquids? Or in other gases? In: Gardner, Kitchen, pp. 32-33
- Falling balloons - speeds at which balloons filled with different gases fall. In: Gardner, Kitchen, pp. 104-106
- Hot gas, cold gas; what happens to the volume of a gas when it's heated? In: Gardner, Kitchen, p. 65
- Investigation of what happens to air when it is heated. In: Jacobson, Science, pp. 55-56
- Solids, liquids and gases - three states of matter. In: Chisholm, Introduction, pp. 8-9

GASES - DENSITY

GASES - DENSITY

How dense! Sci Teach, Oct. '85, pp. 44-45

GEARING

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GEARS

Gears. In: Cooper, How Everyday, pp. 7-8, 10-11

GENERATORS, ELECTRIC

Generator experiment using coiled wire, bar magnet and compass.

In: Math, Morse, pp. 9-10

Induced currents; generators; eddy currents. In: Hilton, Physics, pp. 60-62

Simple generator experiment involving moving a bar magnet back and forth through a coil. In: Math, Wires, p. 13

GENERATORS, ELECTRONIC

Audio-frequency generator with digital readout. In: Hawkins, Digital, pp. 132-143

GENETICS

Counting the probability of incomplete dominance - simulation game using colored beans to illustrate Mendelian genetics. In: Challand, ...Life Sciences, pp. 17, 83

Exploring genetics: experimenting with a sample group of humans regarding tongue rolling and folding, earlobes, hitchhiker's thumb, etc.; also general information on genetics. In: Science Activities, pp. 49-52

GEODESIC DOME

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GEOMETRY

Paper puzzlers - two puzzles, one a tangram. In: Scienceworks, pp. 44-45, 52

GEOTROPISM

Discovering how plants, including seeds, react - thigmotropism, phototropism, hydrotropism, chemotropism, geotropism. In: Challand, ...Life Sciences, pp. 32-33, 85

Seed sense - demonstrating that plants can determine which way to send roots and stems. In: Scienceworks, p. 21

GERBILS

Keeping mammals; what observations can be made of, e.g., gerbils, hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38

GERMINATION

Calculating the rate of seed germination. In: Challand, ...Life Sciences, p. 20

Testing the effect of heat and light on germination. In: Challand, ...Life Sciences, pp. 36, 85

GLACIERS

Glacier model to show formation of eskers, kames, and moraines.

In: Challand, ...Earth Sciences, pp. 16-17

GLASS BLOWING AND WORKING

Flames and ion excitation - flame tests using specially made glass pipettes. Sci Teach, Jan. '85, p. 52

Simple glass tube cutter. In: Hilton, Physics, p. 44

GLIDERS (AERONAUTICS)

See AIRPLANES

GLUCOSE

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GLUE

Casein glue. In: Watson, Liquid, pp. 26-27

Laying a rope; natural plant cordage; fiber flame tests; making your own glue; etc. In: Cobb, Secret, pp. 31-45

GLYCEROL

Determination of glycerol by oxidation with periodate. In: Day, Quantitative, pp. 602-603

GRAPHIC METHODS

Graphs. In: Culver, Introduction, pp. 188-191

Stwertka, Make It Graphic!

-types of graphs, suggested problems, misrepresentation of information with graphs, generating graphs with computers, etc.

Suggested for grades five to nine

GRAVIMETRIC ANALYSIS (CHEMISTRY)

Determination of chlorine in a soluble chloride. In: Day, Quantitative, pp. 580-581

Determination of iron in an oxide ore. In: Day, Quantitative, pp. 583-584

Determination of nickel in steel. In: Day, Quantitative, pp. 584-585

Determination of sulfur in a soluble sulfate. In: Day, Quantitative, pp. 581-583

Electrogravimetric analysis of copper. In: Harris, Quantitative, p. 629

Gravimetric determination of calcium as $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$. In: Harris, Quantitative, p. 615

Gravimetric determination of iron as Fe_2O_3 . In: Harris, Quantitative, pp. 616-617

GRAVITATION

Gravitational bending of starlight (data given). In: Culver, Introduction, pp. 154-159

The trans-Uranian planet: a simplified version of the calculation used to predict the existence of Neptune (data given). In: Culver, Introduction, pp. 23-29

GRAVITY

Experimenting with gravity. In: Challand, ...Earth Sciences, pp. 42, 83

GRAVITY

GRAVITY (continued)

Falling balloons - speeds at which balloons filled with different gases fall. In: Gardner, Kitchen, pp. 104-106

What is gravity? Weighing things; gravity and movement; balancing tricks. In: Wilkes, Simple, pp. 28-29

GREENHOUSE EFFECT (EARTH'S ATMOSPHERE)

See SOLAR HEATING

GREENHOUSES

Greenhouse effect - how can heat energy be trapped. In: Jacobson, Science, pp. 89-90

The home nursery: equipment, propagation media, containers, artificial climates, the potting shed, greenhouses, container growing, chemicals, collecting native plants. In: Hill, Secrets, pp. 3-25

Model solar greenhouse. In: Barling, John Barling's Solar, pp. 79-82

Solar cold frame. In: Barling, John Barling's Solar, pp. 75-78

GROWTH (PLANTS)

Brief suggestions for science explorations in the areas of plant growth and chromatography. In: Tocci, Chemistry, pp. 180-181

Determining how much soil plants use. In: Challand, ...Life Sciences, pp. 25, 84

Determining the role of chlorophyll. In: Challand, ...Life Sciences, pp. 24-25, 84

Discovering the areas of mitosis in stems and roots. In: Challand, ...Life Sciences, pp. 35, 85

Exploring photosynthesis. In: Tocci, Chemistry, pp. 177-178

Growing plants from cuttings. In: Jacobson, Science, pp. 10-11

Needs of green plants - investigation of what green plants need to live and grow. In: Jacobson, Science, pp. 14-15

A plant from a potato. In: Jacobson, Science, pp. 12-13

Seed sense - demonstrating that plants can determine which way to send roots and stems. In: Scienceworks, p. 21

Showing the strength of growing seeds. In: Challand, ...Life Sciences, p. 24

GUINEA PIGS

Keeping mammals; what observations can be made of, e.g., gerbils, hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38

GUPPIES

Raising guppies. In: Challand, ...Life Sciences, p. 56

GYROSCOPE

Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

HALIDES

- Conversion of alcohols to alkyl halides, including preparations of n-butyl bromide, sec-butyl chloride, and t-butyl chloride. In: Wilcox, Experimental, pp. 233-240
- Distinguishing between alkyl and aryl halides with alcoholic silver nitrate and with sodium iodide in acetone. In: Wilcox, Experimental, pp. 153-154
- Potentiometric halide titration with Ag^+ . In: Harris, Quantitative, pp. 627-628

HALOGENS

- Element identification - carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131
- Free-radical halogenation discussion, including instructions for photochemical chlorination of 2,3-dimethylbutane and investigation of substituent effects in free-radical chlorination. In: Wilcox, Experimental, pp. 225-232
- Sodium fusion to test for sulfur, nitrogen and halogens in organic compounds. In: Wilcox, Experimental, pp. 131-133

HAMSTERS

- Keeping mammals; what observations can be made of, e.g., gerbils, hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38

HAND-EYE CO-ORDINATION

See CO-ORDINATION (PHYSIOLOGY)

HARMONIC MOTION

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HEARING

- Audibility analyzer - permits a preliminary self-examination of one's own hearing ability. In: Greene, Easy, pp. 60-61
- Hear a sound and know not where. In: Cobb, How to, pp. 32-34
- How can we locate the direction of sounds we hear? In: Jacobson, Science, pp. 101-102
- How to keep a secret. In: Cobb, How to, pp. 38-39
- Seeing sound and hearing through your teeth. In: Scienceworks, pp. 64-65
- Sounds of the sea - illusions. In: Cobb, How to, pp. 34-35
- Testing your ears - hearing experiment. In: Challand, ...Life Sciences, pp. 71, 88

HEART

- Do you think skeletal or cardiac muscle is stronger - simple demonstration involving squeezing a rubber ball. In: Challand, ...Life Sciences, pp. 69, 87

HEAT

- Cooking outdoors with simple equipment demonstrates aspects of thermal physics. Sci Am, Aug. '85, pp. 114-118, 120
- Dissolving calcium chloride in water and then ammonium nitrate in water to demonstrate production and absorption of heat. Sci Teach, Jan. '84, pp. 29-30
- Energy storage - comparing ability of air and rock to capture and store

HEAT

HEAT (continued)

- heat energy. In: U.S. Department of Energy, Solar...Junior High, pp. 4-1 to 4-6
- Experimenting with the storage of heat by water and soil. In: Arnov, Water, pp. 38-41
- Greenhouse effect - how can heat energy be trapped? In: Jacobson, Science, pp. 89-90
- Thermodynamics and heat engines (brief information). In: Hilton, Physics, pp. 32-33
- What happens to warm air? Hot air rises; cooling down and keeping warm; trapped air keeps things warm. In: Wilkes, Simple, pp. 8-9
- Which metal holds the most heat? In: Gardner, Kitchen, pp. 73-75

HEAT - ABSORPTION

See HEAT - RADIATION AND ABSORPTION

HEAT - CONDUCTION

- Do all materials conduct heat equally? In: Jacobson, Science, pp. 73-74
- Heat transfer: conduction, convection, and radiation (very brief information). In: Hilton, Physics, p. 31
- Indestructible card - card with piece of tinfoil on it does not burn when held over flame. In: McGill, Science, p. 64
- Red hot trick - demonstration of heat conduction. In: Scienceworks, p. 7
- Spoon test - in which spoon will the butter melt more quickly? In: Kent, Introduction, p. 17

HEAT - CONVECTION

- Demonstrations of the movement of air when it is heated. In: Scienceworks, pp. 40-41
- Experimenting with convection in water. In: Challand, ...Earth Sciences, p. 32
- Heat transfer: conduction, convection, and radiation (very brief information). In: Hilton, Physics, p. 31
- How can convection currents be detected? In: Jacobson, Science, p. 75
- Producing convections in air. In: Challand, ...Earth Sciences, pp. 68, 85
- Revolving cardboard snake above candle. In: McGill, Science, pp. 113-114

HEAT - RADIATION AND ABSORPTION

- Boiling water in a paper cup - water takes the heat. In: Tocci, Chemistry, pp. 8-10
- Color and the sun's rays - how long does it take various colors of paper to burn? In: Adams, Catch, pp. 41-42
- A cup of sunlight - effects of heat on various surfaces. In: U.S. Department of Energy, Solar...Earth Science, pp. 15-1 to 15-9
- Do all materials absorb the sun's heat equally? In: Jacobson, Science, pp. 87-88
- Effect of surface color on heat absorption. In: U.S. Department of Energy, Solar...Junior High, pp. 14-1 to 14-8
- Heat transfer: conduction, convection, and radiation (very brief information). In: Hilton, Physics, p. 31
- The heating and cooling of objects by radiation. In: U.S. Department of Energy, Solar...Junior High, pp. 8-1 to 8-10
- How can effects of heat radiation be observed? In: Jacobson, Science, p. 76

HEAT - RADIATION AND ABSORPTION (continued)

- Measuring heat absorption. In: Challand, ...Earth Sciences, p. 69
Weather wear - experimenting with temperatures of water in dark and light cups sitting in the sun. In: Scienceworks, p. 24
What colors of the same material seem to absorb the most heat?
In: Jacobson, Science, p. 36

HEIGHT MEASUREMENT

See PHYSICAL MEASUREMENTS

HELICOPTERS

- Paper plane which works something like a helicopter. In: Scienceworks, p. 77

HERBS

- Wild garden and special herb garden; how to press and identify plants; photographing flowers; projects with wild flowers; etc. In: Brown, Investigating, pp. 223-241

HETEROCYCLIC COMPOUNDS

- Heterocyclic aromatics: preparation of 3-phenylsydnone. In: Wilcox, Experimental, pp. 342-344

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

See CHROMATOGRAPHIC ANALYSIS

HINSBERG TEST

- Hinsberg test. In: Wilcox, Experimental, p. 149

HOLOGRAPHY

- Adding another dimension with holography. Sci Teach, Sept. '84, pp. 24-28
Display holography. In: Wenyon, Understanding Holography, pp. 79-107
Holography and laser physics (very brief bits of information), including description of a simple Fabry-Perot etalon. In: Hilton, Physics, pp. 87-88
Holography as a tool, including holographic microscopy and interferometry. In: Wenyon, Understanding Holography, pp. 108-129
Making your own holograms. In: Wenyon, Understanding Holography, pp. 139-164
Principles of holography. In: Wenyon, Understanding Holography, pp. 55-78

HORSEPOWER (MECHANICS)

- How much horsepower can you produce? In: U.S. Department of Energy, Science, p. [3], and also see teacher's guide

HUBBLE CONSTANT (ASTRONOMY)

See GALAXIES

HUMANS

- How humans are similar and different. In: Jacobson, Science, pp. 98-99

HUMIDITY

- Breeze meter - electronic meter can read changes in barometric pressure and humidity by testing conductivity of air. In: Greene, Easy, pp. 58-59

HUMIDITY

HUMIDITY (continued)

Investigations of various aspects of weather - experiments involving wind, thermometers and air temperature, rays of the sun, moisture in the air, and atmospheric pressure. In: U.S. Department of Transportation, Aviation, pp. 19-33

Making a hygrometer; investigation of how relative humidity can be determined. In: Jacobson, Science, pp. 59-61

Taking control of chamber humidity: here's a low-budget, no-fuss way to maintain the humidity you need in incubation chambers. Sci Teach, Oct. '84, pp. 29-31

HYADES (ASTRONOMY)

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HYDRA

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HYDROCARBONS

See also ALKENES; ALKYNES

Hydrocarbon testing - permanganate test (Baeyer test), bromine test, Friedel-Crafts test. In: Wilcox, Experimental, pp. 150-153

HYDROCHLORIC ACID

See also HYDROGEN CHLORIDE

Determination of the relative concentrations of hydrochloric acid and sodium hydroxide solutions. In: Day, Quantitative, pp. 566-567

The eggs that read - demonstration of sinking, floating and "swimming" eggs placed in water and other solutions of differing densities. In: McGill, Science, pp. 59-60

Preparation of 0.1N solutions of hydrochloric acid and sodium hydroxide. In: Day, Quantitative, pp. 564-565

Standardization of hydrochloric acid solution with sodium carbonate. In: Day, Quantitative, pp. 568-569

HYDROGEN

Changing water to gases with electricity. In: Gardner, Kitchen, pp. 111-114

Electrolysis of water. In: Walters, Chemistry, p. 26

Electrolytic/galvanic cell demonstration - hydrogen electrode. Sci Teach, Apr. '84, pp. 66-67

Element identification - carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131

Explosion of hydrogen and chlorine produces hydrogen chloride. Sci Teach, Jan. '84, pp. 31-32

Generating hydrogen gas. Sci Teach, Jan. '84, p. 30

Making chlorine by electrolysis of concentrated solution of sodium chloride; hydrogen also produced. In: Walters, Chemistry, p. 29

Preparation of hydrogen by the oxidation of iron wool by steam. In: Walters, Chemistry, p. 25

Splitting water and testing the products. In: Cobb, Chemically Active, pp. 61-67

HYDROGEN CHLORIDE

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Explosion of hydrogen and chlorine produces hydrogen chloride.

Sci Teach, Jan. '84, pp. 31-32

HYDROGEN PEROXIDE

The action of liver enzyme and yeast enzyme on hydrogen peroxide.

In: Watson, Liquid, pp. 36-37

Chemical reaction indicated by production of a gas - experiment with hydrogen peroxide and manganese dioxide, and other experiments and observations. In: Cobb, Chemically Active, pp. 51-54

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange - 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Experiment using a catalyst - decomposition of hydrogen peroxide.

In: Chisholm, Introduction, pp. 24-25

Iodometric determination of hydrogen peroxide. In: Day, Quantitative, p. 601

Lab experiment demonstrating effect of enzyme catalase on decomposition of hydrogen peroxide - this column provides two modifications to the common experiment, one regarding extraction of the enzyme from liver and the other involving a simple manometer. Sci Teach, Jan. '84, p. 62

HYDROMETER

Hydrometer from a ball-point pen ink tube. In: Zubrowski, Ball-Point Pens, pp. 17-20

Making a simple hydrometer. In: Watson, Liquid, pp. 18-19

Why not a hydrometer? Sci Teach, Nov. '85, p. 48

HYDROPHONE

The hydrophone, an underwater listening device. In: Graf, Exploring, pp. 177-183

HYDROPONICS

Growing plants with chemicals. In: Challand, ...Life Sciences, p. 31

HYDROTROPISM

Discovering how plants, including seeds, react - thigmotropism, phototropism, hydrotropism, chemotropism, geotropism. In: Challand, ...Life Sciences, pp. 32-33, 85

HYDROXAMATE TEST

Extremely sensitive test for esters - hydroxamate test. In: Wilcox, Experimental, pp. 145-147

HYDROZOA

Feeding a stinging hydra. In: Challand, ...Life Sciences, p. 46

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HYGROMETRY

- Comparing temperatures of wet and dry air. In: Challand, ...Earth Sciences, pp. 66, 35
- Constructing hygrometers. In: Challand, ...Earth Sciences, pp. 64-65
- Making a hygrometer; investigation of how relative humidity can be determined. In: Jacobson, Science, pp. 59-61
- Weather: relative humidity determination uses hygrometers; mechanical gas model and cloud chamber; weather maps (brief information). In: Hilton, Physics, p. 29

ICE

- The heat to melt ice. In: Gardner, Kitchen, pp. 59-61
- Ice lollipop demonstration shows that water expands when it freezes. In: Watson, Liquid, p. 15
- Many experiments with ice and water - melting rate, melting temperature, floating ice, heat of fusion, etc. In: Gardner, Kitchen, pp. 45-61
- Sun energy can melt ice - experiment with two ice cubes. In: Adams, Catch, pp. 35-36
- Turning water into ice - which is less dense? In: Tocci, Chemistry, pp. 7-8
- Water in its three states - demonstrating three states of matter with water. In: Jacobson, Science, pp. 41-42
- Water, with and without added salt - freezing point determinations. In: Tocci, Chemistry, pp. 3-5
- What happens when water freezes - investigation. In: Jacobson, Science, pp. 43-44
- Why an iceberg floats - demonstration of expansion of water on freezing. In: Scienceworks, p. 46

ICE CREAM

- The physics of grandmother's peerless homemade ice cream. Sci Am, Apr. '84, pp. 150-154, and comment Oct. '84, p. 8

ILLUSIONS

See also OPTICAL ILLUSIONS

- Aristotle's illusion. In: Cobb, How to, pp. 10-12
- Can you tell how hot something is? - experiment with three bowls of water. In: Kent, Introduction, p. 15
- Cold reality...or hot? - experiment with pots of water at different temperatures. In: Cobb, How to, pp. 19-20
- Give yourself a lift. In: Cobb, How to, pp. 12-14
- Hear a sound and know not where. In: Cobb, How to, pp. 32-34
- Here's what's wet - dry hands feel wet. In: Cobb, How to, pp. 20-22
- How to keep from kidding yourself - covert muscle tension causes pendulum to swing. In: Cobb, How to, pp. 23-25
- The incredible shrinking cube. In: Cobb, How to, pp. 16-17
- Lightweight thinking. In: Cobb, How to, pp. 14-15
- Our perceptions of motion - optical illusions involving motion or perceived motion. In: Cobb, How to, pp. 83-107

ILLUSIONS (continued)

- A sense of horror - learned expectations can add horror to ordinary objects. In: Cobb, How to, pp. 22-23
 Sounds of the sea - illusions. In: Cobb, How to, pp. 34-35
 What's the point - can you feel one or two points? In: Cobb, How to, pp. 17-18

INCLINED PLANES

See also SCREWS

- Inclined planes. In: Kent, Introduction, p. 31
 Inclined planes and exerting a smaller force over a greater distance. In: Jacobson, Science, pp. 177-178
 Ramp magic - lifting something heavy using a ramp. In: Scienceworks, p. 55
 Ramps or inclined planes: going up ramps, ramps of different lengths, curved ramps, wedges, etc. In: Catherall, Levers, pp. 20-25

INCUBATORS

- Taking control of chamber humidity: here's a low-budget, no-fuss way to maintain the humidity you need in incubation chambers. Sci Teach, Oct. '84, pp. 29-31

INDICATORS AND TEST PAPERS

- Acids and bases; identification using litmus paper or unsweetened grape juice. In: Gardner, Kitchen, pp. 82-84
 Acids and bases - testing substances using phenolphthalein and turmeric. In: Cobb, Chemically Active, pp. 88-92
 Acids, bases and salts; testing acids and alkalis; neutralization reactions; etc. In: Chisholm, Introduction, pp. 28-29
 Colorful solutions made easy - universal indicator in acid-base equilibrium. Sci Teach, Nov. '85, p. 47
 Dyes and indicators - diazonium-coupling reactions, preparations of azo dyes (methyl orange and para red); phthalein and sulfonphthalein indicators, including preparation instructions for o-cresol red. In: Wilcox, Experimental, pp. 408-416
 Essence of cabbage - using cabbage to make a chemical indicator. In: Cobb, Chemically Active, pp. 8-11
 Indicators. In: Jennings, Everyday Chemicals, pp. 30-31
 Foaming colors: chemical color change demonstration using sodium hydroxide solution, Universal Indicator, and dry ice. Sci Teach, Jan. '84, p. 64
 Iodine to ink - a test for starch. In: Gardner, Kitchen, pp. 81-82
 Is it wine or is it water? - demonstration using phenolphthalein solution, sodium hydroxide solution and sulphuric acid. In: McGill, Science, pp. 56-57
 Red cabbage - a natural indicator; also suggestions of substances which might be checked for pH; using universal pH paper. In: Tocci, Chemistry, pp. 74-75
 Spectrophotometric determination of the pK_a of an acid-base indicator. In: Day, Quantitative, pp. 608-611
 Testing for acids and bases with red cabbage indicator. In: Walters, Chemistry, p. 16
 Various experiments showing how acids and alkalis behave and tests to

INDICATORS AND TEST PAPERS

INDICATORS AND TEST PAPERS (continued)

- distinguish between them - fizzy lemonade, invisible ink, dancing mothballs, indicators. In: Watson, Liquid, pp. 32-35
- "Water" into "wine" trick using an acid, an alkali and phenolphthalein indicator. In: Walters, Chemistry, p. 21
- The wine and water trick, using phenolphthalein indicator, tartaric acid and potassium or sodium carbonate. In: McGill, Science, pp. 53-56

INDUCTANCE

- Inductance (brief information). In: Hilton, Physics, pp. 66-67

INDUCTION (ELECTRICITY)

- Induction telephone pickup - amplified telephone conversations or telephone bells; listen to pocket calculators; listen to magnetized wire; detect magnetic field leakage; etc. In: Graf, Exploring, pp. 31-54
- Magnetic induction (very brief information). In: Hilton, Physics, p. 62

INERTIA (MECHANICS)

See also MOMENTS OF INERTIA

- Inertia trick using a glass and coins. In: Scienceworks, p. 3
- Mysterious breaking string - inertia demonstration using string and a book. In: Scienceworks, p. 5
- Newton's First Law of Motion: tablecloth experiment, ball and moving car, water hammer, a body at rest, and hit the nail on the head. In: Hilton, Physics, pp. 5-6
- Simple demonstration of inertia. Sci Teach, Apr. '84, p. 67
- Static equilibrium: pulleys add a new direction to experiments that demonstrate forces. Sci Teach, Dec. '85, pp. 20-23

INFECTION

- Exploring microbes: experiment (Pasteur's experiment) showing how microbes cause infection, and general information on microorganisms. In: Science Activities, pp. 29-32

INFRARED SPECTROMETRY

- Infrared spectroscopy. In: Wilcox, Experimental, pp. 186-196

INK

- Chemical reaction indicated by a color change - experiments with visible and invisible inks. In: Cobb, Chemically Active, pp. 58-59
- How can we separate different colours? In: Jennings, Everyday Chemicals, pp. 29-30
- Invisible ink. In: Scienceworks, p. 75
- Invisible ink, and making the visible invisible. In: Gardner, Kitchen, pp. 75-76, 78
- Invisible ink, using lemon juice. In: Jennings, Everyday Chemicals, pp. 10-11
- Making real ink disappear. In: Gardner, Kitchen, pp. 78-79

INSECT BAITS AND REPELLENTS

- Pheromones and insect repellents - general discussion of pheromones and repellents and instructions for preparation of the insect repellent N,N-diethyl-m-toluamide. In: Wilcox, Experimental, pp. 369-372

INSECT REPELLENTS

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INSECTS

Capturing and keeping live insects - methods of capture, experiments with black-light traps, making cages, aquariums and terrariums and using them in experiments with insects, etc. In: Brown, Investigating, pp. 81-98

Testing the strength of insects. In: Brown, Investigating, pp. 115-118

Tree-dwelling mammals, reptiles, amphibians and insects, including suggestions for projects. In: Brown, Investigating, pp. 151-154

INSECTS - COLLECTION AND PRESERVATION

Collecting and studying insects. In: Jacobson, Science, pp. 24-25

Inexpensive specimen boxes. Sci Teach, Jan. '84, p. 64

Killing and mounting insects. In: Brown, Investigating, pp. 87-89

INSULATION (HEAT)

How insulation affects the amount of heat retained in warm water.

In: Jacobson, Science, pp. 93-94

How much longer will it take the temperature to rise 5 degrees Celsius through one piece of glass compared to three pieces of glass? In:

U.S. Department of Energy, Science, pp. [7-8], and see also teacher's guide

Insulation: can it keep heat in and out. In: U.S. Department of Energy, Solar...Junior High, pp. 9-1 to 9-9

What happens to warm air? Hot air rises; cooling down and keeping warm; trapped air keeps things warm. In: Wilkes, Simple, pp. 8-9

What is the approximate R-value of 3/4" wood? In: U.S. Department of Energy, Science, p. [6], and also see teacher's guide

Will an R-1 material let heat through twice as fast as an R-2 material?

In: U.S. Department of Energy, Science, p. [5], and see teacher's guide

INTEGRATED CIRCUITS

See ELECTRONIC CIRCUITS

INTERCOMMUNICATION SYSTEMS

Basic digital transmission of data. In: Boyd, Fiber, pp. 108-111

Multitone modulation of digital transmission - fiber optics pulse transmission system. In: Boyd, Fiber, pp. 112-114

Pulse-frequency modulation: to demonstrate "successful transmission and reception of digital pulse-frequency voice modulation over a fiber-optic link". In: Boyd, Fiber, pp. 119-123

Sound over a light beam. In: Graf, One, pp. 111-121

INTERFERENCE (LIGHT) AND INTERFEROMETERS

Diffraction and interference - single and multiple slits, interference in thin films, Pohl's experiment, Newton's Rings, Arago's White Spot, acoustical interference, etc. In: Hilton, Physics, pp. 78-83

INTESTINES

Demonstrating absorption in the small intestine. In: Challand, ...Life Sciences, pp. 68, 87

INVERTEBRATES

INVERTEBRATES

See also names of specific groups of invertebrates, e.g., TURBELLARIA

Turning over a wet leaf - investigating aquatic invertebrates.

Sci Teach, Sept. '85, pp. 20-24

Working with lower animals - the invertebrates. A variety of investigations are discussed (each indexed separately). In: Challand, ...Life Sciences, pp. 46-54

INVISIBLE WRITING

See WRITING, INVISIBLE

IO (MOON OF JUPITER)

Eye on Io - studying the motion of Jupiter's moon, Io. Sci Teach, May '85, pp. 42-45

IODIDES

Color changing powder - demonstration of color change on mixing of potassium iodide and lead nitrate. In: McGill, Science, pp. 63-64

In the balance: a stoichiometric experiment that works, using copper(I) iodide. Sci Teach, May '84, pp. 56-57

Precipitation titrations - potentiometric determination of chloride and of a chloride-iodide mixture. In: Day, Quantitative, pp. 616-617

Second-order nucleophilic substitution, including preparation of n-butyl iodide. In: Wilcox, Experimental, pp. 241-244

IODINE

Determination of bleaching power by iodometry. In: Day, Quantitative, pp. 601-602

Determination of glycerol by oxidation with periodate. In: Day, Quantitative, pp. 602-603

Iodimetric titration of vitamin C. In: Harris, Quantitative, p. 627

Iodine and water/flour solution demonstration. In: Arnov, Water, pp. 23-24

Iodine clock reaction. Sci Teach, Sept. '84, p. 31, and comments and corrections Mar. '85, p. 64

Iodine to ink - a test for starch. In: Gardner, Kitchen, pp. 81-82

Iodometric determination of hydrogen peroxide. In: Day, Quantitative, p. 601

Preparation and standardization of a 0.1N iodine solution. In: Day, Quantitative, pp. 596-597

Testing for carbohydrates. In: Challand, ...Life Sciences, p. 62

Test for starch. In: Cobb, Chemically Active, p. 131

Testing for vitamin C using starch and iodine solutions. In: Tocci, Chemistry, pp. 24-27

Watch an enzyme at work - iodine test on starch solution and on starch and saliva mixture. In: Chisholm, Introduction, p. 25

IODOFORM TEST

Iodoform test. In: Wilcox, Experimental, pp. 141-143

ION-EXCHANGE RESINS

Properties of an ion-exchange resin. In: Harris, Quantitative, pp. 634-636

IRIS (EYE)

See EYE

IRON

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange -- 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Determination of iron in an ore. In: Day, Quantitative, pp. 589-592

Determination of iron in an ore. In: Day, Quantitative, p. 595

Determination of iron in an ore, using dichromate. In: Day, Quantitative, p. 596

Determination of iron in an oxide ore. In: Day, Quantitative, pp. 583-584

Determination of iron with 1,10-phenanthroline spectrophotometrically.

In: Day, Quantitative, pp. 605-606

Electron flow between iron and copper. In: Tocci, Chemistry, pp. 144-146

Food additives that fortify - testing for iron in foods. In: Tocci, Chemistry, pp. 58-60

Gravimetric determination of iron as Fe_2O_3 . In: Harris, Quantitative, pp. 616-617

How metals react; what makes things rust? Flame tests for metals.

In: Chisholm, Introduction, pp. 26-27

Preparation of hydrogen by the oxidizing of iron wool by steam. In: Walters, Chemistry, p. 25

Redox titrations to illustrate the potentiometric technique - titration of iron(II) with dichromate or cerium(IV) solution. In: Day, Quantitative, pp. 615-616

Spectrophotometric determination of iron in vitamin tablets. In: Harris, Quantitative, pp. 631-633

- IRON COMPOUNDS

The black hand - hand rubbed with some powdered tannic acid and then dipped in iron sulphate solution will turn black. In: McGill, Science, p. 71

Chemical reaction indicated by precipitate formation - experiment with ferrous sulfate solution and tannic acid. In: Cobb, Chemically Active, pp. 54-57

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange -- 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Determination of iron in an oxide ore. In: Day, Quantitative, pp. 583-584

Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63

IRON COMPOUNDS

IRON COMPOUNDS (continued)

- Magic wound - iron chloride and sodium sulphocyanate solution will react to give a red, blood-like color. In: McGill, Science, pp. 68-69
- Metallocenes, including instructions for preparation of ferrocene and acetylferrocene. In: Wilcox, Experimental, pp. 402-407
- Preparing iron sulfate solution, and a general discussion of solutions. In: Cobb, Chemically Active, pp. 18-25

IRON ORES

- Determination of iron in an ore. In: Day, Quantitative, pp. 589-592
- Determination of iron in an ore. In: Day, Quantitative, p. 595
- Determination of iron in an ore, using dichromate. In: Day, Quantitative, p. 596

JET PROPULSION

- Balloon jet. In: Fitzpatrick, In the Air, pp. 26-27
- A boat with power - power provided by a deflating balloon. In: Gardner, Kitchen, pp. 39-40
- Experimenting with balloon rockets. In: Challand, ...Earth Sciences, pp. 56, 84
- How does a rocket work? In: Jacobson, Science, pp. 190-191

JUPITER (PLANET)

- Eye on Io - studying the motion of Jupiter's moon, Io. Sci Teach, May '85, pp. 42-45
- Jupiter: an amateur's guide to research projects. In: Sherrod, Complete Manual, pp. 160-179, 283
- Mass of Jupiter, using photographs of Jupiter's Galilean satellites (data given). In: Culver, Introduction, pp. 58-73

KALEIDOSCOPE

- The kaleidoscope now comes equipped with flashing diodes and focusing lenses. Sci Am, Dec. '85, pp. 134-138, 144-145
- Making a simple kaleidoscope. In: Fitzpatrick, Mirrors, pp. 24-25
- Reflections, including making a simple kaleidoscope. In: Wilkes, Simple, pp. 22-23

KAMES

- See GLACIERS

KEPLER'S LAWS

- See MECHANICS, CELESTIAL

KETONES

- Aldol condensation, including preparation of dibenzalacetone. In: Wilcox, Experimental, pp. 345-347
- The benzoin condensation, including discussion of vitamin B₁ catalysis, and preparation and reactions of benzoin and preparation and reactions of benzil. In: Wilcox, Experimental, pp. 348-357
- Discussion of the Wittig reaction and preparation of p-methoxystilbene. In: Wilcox, Experimental, pp. 287-290

KETONES (continued)

Enamine synthesis of a diketone: 2-acetylcyclohexanone. In: Wilcox, Experimental, pp. 383-386

The pinacol-pinacolone rearrangement - general discussion, and instructions on preparation of benzopinacol by photochemical reduction and the production of benzopinacolone. In: Wilcox, Experimental, pp. 373-377

Preparation of aldehydes and ketones by oxidation, including a discussion of chromic acid oxidation of alcohols and preparations of 2-pentanone and cyclohexanone. In: Wilcox, Experimental, pp. 276-280

Reactions of aldehydes and ketones, including discussions of carbonyl addition reactions and reduction of carbonyl compounds. Two experiments given. In: Wilcox, Experimental, pp. 281-286

Schiff's fuchsin test. In: Wilcox, Experimental, pp. 144-145

The 2,4-dinitrophenylhydrazone test. In: Wilcox, Experimental, p. 143

KITES

How to make your own kite. In: Fitzpatrick, In the Air, pp. 8-11

KNOTS AND SPLICES

Cat's cradle and other topologies formed with a two-meter loop of flexible string. Sci Am, May '85, pp. 138-144

LABORATORIES - SAFETY MEASURES

Safety in the analytical laboratory (a brief discussion). In: Day, Quantitative, pp. 549-551

Eye and face protection/chemistry lab: mannequin demo. Sci Teach, Dec.'84, p.49

LABORATORIES, CHEMICAL

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LASERS

Applications of lasers. In: Wenyon, Understanding Holography, pp. 42-54
Holography and laser physics (very brief bits of information), including description of a simple Fabry-Perot etalon. In: Hilton, Physics, pp. 87-88

Production of light: the laser. In: Wenyon, Understanding Holography, pp. 30-41

LATITUDE

Making a globe in order to work with latitude and longitude. In: Challand, ...Earth Sciences, pp. 58-59

LEAD NITRATE

Color changing powder - demonstration of color change on mixing of potassium iodide and lead nitrate. In: McGill, Science, pp. 63-64

LEAVES

Getting raw materials into a plant - experiment involving coating some leaves. In: Challand, ...Life Sciences, pp. 26-27, 84

Making 3-D clay models of leaf cells. Sci Teach, Oct. '84, pp. 59-60

Photochemistry, including how to make a photographic wet plate and investigation of leaves. In: Cobb, Chemically Active, pp. 135-137

LEAVES

LEAVES (continued)

- Separating components of chlorophyll from leaves using paper chromatography. In: Tocci, Chemistry, pp. 178-180
- Striped celery, changing colors of flowers, and preserving leaves through capillarity using glycerine. In: Watson, Liquid, pp. 8-11
- Watching movement in living cells - Elodea is a good choice. In: Challand, ...Life Sciences, p. 34

LEMON

- Make your own battery with a lemon; how a battery works. In: Kent, Introduction, p. 34
- Making an electric battery from a lemon. Experimenting with different citrus fruits and different metals. In: Tocci, Chemistry, pp. 142-143
- Ultra-simple lemon battery demonstrates Volta's discovery. In: Math, Wires, pp. 4-5

LENSES

- A ball bearing aids in the study of light and also serves as a lens. Sci Am, Nov. '84, pp. 186-187, 190-194
- Fresnel lens concentrator. In: Barling, John Barling's Solar, pp. 98-100
- Lenses. In: Cooper, How Everyday, pp. 33-35
- Lenses, including brief section on optical disk. In: Hilton, Physics, p. 72
- Magnifying experience - making a water lens using plastic wrap and a plastic pail. In: Scienceworks, p. 78
- Ride-on physics at the amusement park - acceleration, pendulum action, lenses. Sci Teach, Oct. '84, pp. 36-40
- A water-drop magnifier. In: Jacobson, Science, p. 46
- Water drop on a transparent plastic ball-point pen case acts as a magnifier. In: Zubrowski, Ball-Point Pens, pp. 43-44

LEVERS

- The advantage of a lever. In: Catherall, Levers, p. 10
- Altering the fulcrum of a seesaw. In: Catherall, Levers, p. 9
- Balancing weights. In: Jacobson, Science, pp. 170-171
- Classes of levers. In: Catherall, Levers, p. 13
- How can we lift objects with levers? In: Jacobson, Science, pp. 173-174
- Levers. In: Kent, Introduction, pp. 30-31
- Levers in your body. In: Catherall, Levers, p. 18
- Second-class levers, and using them. In: Catherall, Levers, pp. 14-15
- Simple machines, including levers and pulleys. In: Wilkes, Simple, pp. 32-33
- Third-class levers, and using them. In: Catherall, Levers, pp. 16-17
- Tools: simple machines -- hammers as levers; nails, tacks, chisels and other wedges; screws, etc. In: Cobb, Secret, pp. 46-65
- Using a pair of levers. In: Catherall, Levers, p. 12
- Using a seesaw. In: Catherall, Levers, p. 8
- Using levers. In: Catherall, Levers, p. 11

LIEBIG METHOD (CHEMISTRY)

See VOLUMETRIC ANALYSIS (CHEMISTRY)

LIGHT

- A ball bearing aids in the study of light and also serves as a lens. Sci Am, Nov. '84, pp. 186-187, 190-194
- Chemical light show using a variety of chemicals. Sci Teach, Jan. '84, pp. 30-31
- The color disc -- spinning it fast enough makes it appear white. In: McGill, Science, p. 127
- Demonstrating that light travels in straight lines. In: Jacobson, Science, pp. 77-78
- Experiment involving getting acquainted with a "light pipe". In: Boyd, Fiber, pp. 77-86
- Fiber-optics light transmission cable. In: Boyd, Fiber, pp. 148-152
- Gravitational bending of starlight (data given). In: Culver, Introduction, pp. 154-159
- How many 25-watt bulbs equal the light output of one 100-watt bulb? Uses light meter in previous experiment, pp. 9-10. In: U.S. Department of Energy, Science, pp. [11-12], and see teacher's guide
- How much energy is saved when a dimmer switch is used with a 100-watt bulb? In: U.S. Department of Energy, Science, pp. [13-14], and see also teacher's guide
- How much light does a bulb give off at a distance of one foot compared to a distance of three feet? Includes instructions on making a light meter. In: U.S. Department of Energy, Science, pp. [9-10], and see also teacher's guide
- Improved modulator. In: Boyd, Fiber, pp. 98-103
- Light-beam voice and music modulator. In: Boyd, Fiber, pp. 87-97
- Light-intensity-level Wheatstone bridge. In: Graf, One, pp. 89-94
- Light-sensitive audio oscillator: the Sonalight -- changes light intensity into sound. In: Graf, One, pp. 66-78
- Making a polarimeter and exploring light with it; showing how light is polarized; general information on nature and behavior of light. In: Science Activities, pp. 45-48
- A pocket electronic color organ. In: Traister, Third, pp. 15-16
- Properties of light: pin hole camera, inverse square law, mirrors (brief descriptions). In: Hilton, Physics, pp. 69-70
- Single-channel light organ. In: Traister, Second, pp. 43-48
- Sound over a light beam. In: Graf, One, pp. 111-121

LIGHT - ABSORPTION

See ABSORPTION OF LIGHT

LIGHT - SPEED

Determination of the speed of light through measuring lunar trigonometric parallax and radar travel time to the moon (data given). In: Culver, Introduction, pp. 1-9

LIGHT BEAM TRANSMISSION

See SOUND - TRANSMISSION

LIGHT EMITTING DIODES

See DIODES, SEMICONDUCTOR

LIGHT METER

See ELECTRIC METERS; PHOTOELECTRIC DEVICES

LIGHT ORGAN

LIGHT ORGAN

See ELECTRONIC APPARATUS AND APPLIANCES

LIGHT PENS

Fiber optics light pen cable. In: Boyd, Fiber, pp. 153-157

Single-fiber passive light pen. In: Boyd, Fiber, pp. 158-162

LIQUIDS

See also VISCOSITY

Changing two liquids to a solid, using calcium chloride and potassium carbonate. In: McGill, Science, p. 66

Demonstration of miscibility and immiscibility of liquids. In: Gardner, Kitchen, pp. 31-32

Edge waves form spokelike pattern when vibrations are set up in a liquid. Sci Am, Dec. '84, pp. 130, 135-138, 146

Experimenting with drops of various liquids on waxed paper. In: Gardner, Kitchen, pp. 11-12

Experimenting with the shapes of drops of liquids on different surfaces. In: Gardner, Kitchen, p. 12

Heaping liquids, including water -- experimenting with filling a container above the rim with various liquids. In: Gardner, Kitchen, pp. 9-10

More experiments with climbing liquids; experimenting with liquids other than water. In: Gardner, Kitchen, p. 18

Solids, liquids and gases -- three states of matter. In: Chisholm, Introduction, pp. 8-9

The stickiness or cohesiveness of liquids. In: Zubrowski, Ball-Point Pens, pp. 23-26

The troublesome teapot effect, or why a poured liquid clings to the container. Sci Am, Oct. '84, pp. 144, 146-150, 152, 154

LIQUIDS - DENSITY

Colored liquids that sink or float -- experiment with salt solutions of various concentrations. In: Gardner, Kitchen, pp. 99-104

Floating liquids - liquid layers of different densities. In: Watson, Liquid, pp. 16-17

How dense! Sci Teach, Oct. '85, pp. 44-45

Hydrometer from a ball-point pen ink tube. In: Zubrowski, Ball-Point Pens, pp. 17-20

Making a simple hydrometer. In: Watson, Liquid, pp. 18-19

Pieces of equipment useful in demonstrating density matters (brief information). In: Hilton, Physics, p. 24

Regular versus diet soda - who's denser? In: Tocci, Chemistry, pp. 28-29

Science corner - demonstrating differing densities using water, alcohol and an ice cube. Sci Teach, April '85, p. 61

Sinking balloons, floating balloons -- experiments with liquids of different density. In: Gardner, Kitchen, pp. 38-39

Why not a hydrometer? Sci Teach, Nov. '85, p. 48

LISSAJOUS' CURVES

Lissajous figures. In: Hilton, Physics, pp. 34-35

LIVER

The action of liver enzyme and yeast enzyme on hydrogen peroxide.
In: Watson, Liquid, pp. 36-37

LIZARDS

Lizards -- catching lizards, lizards in captivity, experiments with lizards. In: Brown, Investigating, pp. 65-72

LOCKS AND KEYS

Locks and keys: discussion and diagrams. In: Cooper, How Everyday, p. 19
Simple electromagnetic lock and a "combination" lock switch. In: Math, Wires, pp. 51-52
Sound unlocker. In: Greene, Easy, pp. 64-65

LONGITUDE

Making a globe in order to work with latitude and longitude. In: Challand, ...Earth Sciences, pp. 58-59

LOUDSPEAKERS

How loudspeakers work. In: Kent, Introduction, p. 39

LUCAS TEST

Lucas test distinguishes among primary, secondary and tertiary alcohols.
In: Wilcox, Experimental, p. 141

LUNGS

Calculating your lung capacity. In: Challand, ...Life Sciences, pp. 66-67
What is the volume of air our lungs can displace? In: Jacobson, Science, pp. 112-113

LYCOPodium POWDER

Dry water -- lycopodium invisible on skin and will keep hand dry when it's dipped in water; same powder will make spectacular flash in a candle flame. In: McGill, Science, p. 67

MAGNESIUM

EDTA titration of Ca^{2+} and Mg^{2+} in natural waters. In: Harris, Quantitative, pp. 624-625
How things burn; weighing the ash - when paper and magnesium are burned, is the ash produced heavier or lighter? In: Walters, Chemistry, pp. 6-7
Using flash bulbs, magnesium, copper and sulphuric acid to demonstrate electricity production. Sci Teach, Jan. '84, p. 32

MAGNESIUM SULPHATE

Growing crystals, using copper sulphate, chrome alum, potassium nitrate or magnesium sulphate. In: Jennings, Everyday Chemicals, pp. 24-25
Making stalactites and stalagmites using Epsom salts. In: Challand, ...Earth Sciences, pp. 31, 82

MAGNETIC FIELDS

MAGNETIC FIELDS

Current carrying conductors and magnetic fields; electric motors.

In: Hilton, Physics, pp. 58-60

Fields of force: see field of invisible force that surrounds a magnet. In: Ardley, Exploring, pp. 12-13

Magnetic images -- using iron filings to form patterns of magnet's force field, etc. In: Scienceworks, pp. 80-81

Shorted input transducer - listening to Barkhausen noise, locating hidden or unknown magnetic fields, listening to a paper clip, etc.

In: Graf, Exploring, pp. 165-175

Strange effects: magnetic fields around magnets can behave in unusual ways. In: Ardley, Exploring, pp. 22-25

MAGNETIC INDUCTION

See INDUCTION (ELECTRICITY)

MAGNETISM

The action of magnets: how far can a magnet's power extend. In: Ardley, Exploring, p. 8

Demonstrating the Curie point of ferromagnetic metals. Sci Teach, Dec. '84, pp. 50-51

Demonstration of Faraday's experiment that electricity can be converted to magnetism and vice versa. In: Math, Wires, pp. 5-6

Find out which materials are magnetic and which are not. In: Ardley, Exploring, pp. 6-7

Magic boat - a magnetic boat. In: Ardley, Exploring, p. 9

Magic with magnetism - sixteen simple tricks and experiments involving magnets and magnetism and done with easily obtainable materials.

In: McGill, Science, pp. 1-29

Magnetic properties of matter - Curie temperature, diamagnetic material, hysteresis loop, Barkhausen effect. In: Hilton, Physics, pp. 63-64

Magnetism (brief information). In: Hilton, Physics, pp. 57-58

Magnetism: what is a magnet, make a magnet, fields of force, destroying magnetism, electricity and magnetism. In: Kent, Introduction, pp. 36-37

Power of attraction: see how magnets can attract objects and produce magnets. In: Ardley, Exploring, pp. 16-17

Shorted input transducer -- listening to Barkhausen noise, locating hidden or unknown magnetic fields, listening to a paper clip, etc.

In: Graf, Exploring, pp. 165-175

Vanishing magnetism: magnetism can be made to disappear for a time or it may be lost entirely. In: Ardley, Exploring, pp. 20-21

What kinds of materials will magnetism pass through? In: Jacobson, Science, pp. 143-144

MAGNETISM, TERRESTRIAL

Measuring earth's magnetic field. In: Challand, ...Earth Sciences, pp. 34-35

MAGNETIZATION

Making magnets. In: Jacobson, Science, pp. 140-141

MAGNETS

- The action of magnets: how far can a magnet's power extend. In: Ardley, Exploring, p. 8
- Activities with magnets -- "underwater rescue" and making chains of items, etc. In: Fitzpatrick, Magnets, pp. 13-15, 19-21
- Breaking magnets: what happens when magnets are broken or cut? In: Jacobson, Science, p. 142
- How to make your own magnet. In: Fitzpatrick, Magnets, pp. 16-17
- Magic with magnetism - sixteen simple tricks and experiments involving magnets and magnetism and done with easily obtainable materials. In: McGill, Science, pp. 1-29
- Magnetic poles - what are their effects. In: Ardley, Exploring, pp. 10-11
- Magnetic powers; poles of a magnet; making a magnet; finding north; etc. In: Wilkes, Simple, pp. 34-35
- Magnetism: what is a magnet, make a magnet, fields of force, destroying magnetism, electricity and magnetism. In: Kent, Introduction, pp. 36-37
- Magnets can push: they can make objects float above the ground or force each other aside. In: Ardley, Exploring, pp. 18-19
- Making magnets. In: Jacobson, Science, pp. 140-141
- Power of attraction: see how magnets can attract objects and produce magnets. In: Ardley, Exploring, pp. 16-17
- Strange effects: magnetic fields around magnets can behave in unusual ways. In: Ardley, Exploring, pp. 22-25
- The swinging magnet and the floating magnet - which way will they point? In: Fitzpatrick, Magnets, pp. 22-26
- Tracking what things are attracted by a magnet by using a flow chart. In: Fitzpatrick, Magnets, p. 9
- Using a magnet to generate electricity. In: Jacobson, Science, p. 156
- What happens when you put two magnets together? - attraction and repulsion. In: Fitzpatrick, Magnets, p. 18
- What objects around us are magnets? Finding magnets. In: Jacobson, Science, p. 139
- What things will a magnet attract? In: Fitzpatrick, Magnets, pp. 3-8
- What things will a magnet work through? In: Fitzpatrick, Magnets, p. 12
- Where are the poles of a magnet? In: Jacobson, Science, pp. 137-138
- Which part of the magnet is best for attracting things? In: Fitzpatrick, Magnets, pp. 10-11

MAGNIFIERS AND MAGNIFICATION

See LENSES

MAMMALS

- Keeping mammals; what observations can be made of, e.g., gerbils, hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38
- Tree-dwelling mammals, reptiles, amphibians and insects, including suggestions for projects. In: Brown, Investigating, pp. 151-154

MANGANESE

- Determination of manganese in steel spectrophotometrically. In: Day, Quantitative, pp. 603-605

MANGANESE DIOXIDE

MANGANESE DIOXIDE

Chemical reaction indicated by production of a gas -- experiment with hydrogen peroxide and manganese dioxide, and other experiments and observations. In: Cobb, Chemically Active, pp. 51-54

Determination of oxygen in pyrolusite (manganese dioxide ore). In: Day, Quantitative, pp. 592-593

MANGANESE SULPHATE

Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63

MANOMETER

Lab experiment demonstrating effect of enzyme catalase on decomposition of hydrogen peroxide - this column provides two modifications to the common experiment, one regarding extraction of the enzyme from liver and the other involving a simple manometer. Sci Teach, Jan. '84, p. 62

MANOMETRIC CAPSULE

See SOUND

MAPS

How can we make a map? In: Jacobson, Science, pp. 122-123

MARGARINE

Fats and margarines: what are polyunsaturates? Testing using iodine and an organic solvent. In: Chisholm, Introduction, p. 35

MARINE ALGAE

See SEAWEED

MARS (PLANET)

Atmospheres of Venus and Mars - a non-spectroscopic investigation (photos and other data given). In: Culver, Introduction, pp. 51-57

Mars: the red planet - amateur studies. In: Sherrod, Complete Manual, pp. 140-159, 282

- MASS (PHYSICS)

Length, mass, time: models of fundamental units, micrometer and vernier calipers, slide rule and a vernier scale, time signals, Greenwich and sidereal times (brief information). In: Hilton, Physics, pp. 1-2

MASS SPECTROMETRY

Identification of structure by spectrometric methods. In: Wilcox, Experimental, pp. 183-186

MATTER

Solids, liquids and gases - three states of matter. In: Chisholm, Introduction, pp. 8-9

Water in its three states - demonstrating three states of matter with water. In: Jacobson, Science, pp. 41-42

MEAL WORMS

Watching "worms" grow into beetles. In: Challand, ...Life Sciences, p. 48

MECHANICS, CELESTIAL

Kepler's Laws: constructing an ellipse, elliptical path from air table puck, escape velocity (brief information). In: Hilton, Physics, pp. 19-20

MELTING POINTS

Melting points - theory and apparatus; representative procedure. In: Wilcox, Experimental, pp. 62-68, 75

MEMORY

How not to keep a secret - passing a message along among a number of people to determine whether it becomes altered. In: Cobb, How to, pp. 39-40

METAL DETECTORS

A pipe and cable detector - a simple metal locator. In: Traister, Third, pp. 52-54

METALLOCENES

Metallocenes, including instructions for preparation of ferrocene and acetylferrocene. In: Wilcox, Experimental, pp. 402-407

METALS

Demonstrating the Curie point of ferromagnetic metals. Sci Teach, Dec. '84, pp. 50-51

How metals react; what makes things rust? Flame tests for metals. In: Chisholm, Introduction, pp. 26-27

Metal cleaner -- experiments with metals, vinegar and salt. In: Gardner, Kitchen, p. 42

Testing for metals - some questions to ask. In: Chisholm, Introduction, p. 5

Which metal holds the most heat? In: Gardner, Kitchen, pp. 73-75

METALS, EFFECT OF TEMPERATURE ON

Expansion in metals and liquids (very brief information). In: Hilton, Physics, p. 30

- METEOROLOGY

See also CONDENSATION

A cobalt chloride weather indicator. In: Tocci, Chemistry, pp. 151-152

How weather maps can be used as a basis for learning activities. In: Jacobson, Science, pp. 66-67

Investigations of various aspects of weather - experiments involving wind, thermometers and air temperature, rays of the sun, moisture in the air, and atmospheric pressure. In: U.S. Department of Transportation, Aviation, pp. 19-33

Making an aneroid barometer to monitor the weather; also some general information on meteorology. In: Science Activities, pp. 53-56

Weather charts, and recording and predicting weather. In: Challand, ...Earth Sciences, pp. 77-78

Weather: relative humidity determination uses hygrometers; mechanical gas model and cloud chamber; weather maps (brief information).

In: Hilton, Physics, p. 29

METEORS

METEORS

Meteors, including photography. In: Mayer, Starwatch, pp. 125-127

Observations of meteors. In: Sherrod, Complete Manual, pp. 39-60, 279

METHYL BENZOATE

Esters: general discussion of esterification and saponification, fats and fatty oils, detergents and wetting agents; instructions for esterification of acetic acid and preparation of methyl benzoate.

In: Wilcox, Experimental, pp. 295-302

METRONOME

Drummer's buddy -- an electronic metronome. In: Traister, Third, pp. 44-45

Electronic metronome. In: Greene, Quick-N-Easy, pp. 38-39

Pulse-transmitting metronome circuit - experiment with a short-range transmitter. In: Traister, Second, pp. 38-42

Two transistor metronome/tone source. Computers & Electronics, Jan. '84, pp. 96-98

MICE

Keeping mammals; what observations can be made of, e.g., gerbils, hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38

MICROBIOLOGY

Extra-classroom microbiology using petri dishes and cotton swabs.

Sci Teach, Apr. '84, p. 35

Student research ideas based on several common microbiology kits available from biological supply houses. Sci Teach, Apr. '84, p. 35

MICROCOMPUTERS

See COMPUTERS

MICRO-ORGANISMS

Exploring microbes: experiment (Pasteur's experiment) showing how microbes cause infection, and general information on microorganisms.

In: Science Activities, pp. 29-32

- MICROPHONE

See also HYDROPHONE

The audio microphone. In: Graf, Exploring, pp. 55-60

Details of first telephone; how to hook up an "earphone telephone"; carbon microphone that can be built by experimenter; carbon microphone telephone circuit, etc. In: Math, Morse, pp. 22-29

Fixed-output microphone mixer. In: Traister, Second, pp. 55-60

High-to-low microphone-impedance converter. In: Traister, Second, pp. 49-54

Integrated-circuit microphone amplifier with compression. In: Traister, Second, pp. 70-72

Rain-alert microphone. In: Graf, Exploring, pp. 185-190

Talking on a light beam. In: Math, Morse, pp. 36-49

MICROSCOPE AND MICROSCOPY

- Aquatic organisms under the microscope. In: Curry, Under, pp. 67-79
- Choosing and using a microscope. In: Curry, Under, pp. 11-30
- Constructing a home-made microscope. In: Curry, Under, pp. 31-40
- Magnifying experience -- making a water lens using plastic wrap and a plastic pail. In: Scienceworks, p. 78
- Minerals, crystals and rocks under the microscope. In: Curry, Under, pp. 80-98
- Mounting specimens for the microscope. In: Curry, Under, pp. 41-53
- Plant and animal tissues under the microscope. In: Curry, Under, pp. 54-66
- Some special methods in microscopy: dark field illumination, Rheinberg illumination, stopped-down contrast, oblique illumination, phase contrast, differential interference contrast, Hoffman modulation contrast, autoradiography, fluorescence staining, fluorescent antibody labelling, incident light microscopes, modern trends. In: Curry, Under, pp. 109-125

MILK

- Curd cheese - made by splitting up an emulsion. In: Watson, Liquid, pp. 24-25
- The fat and protein content of milk. In: Tocci, Chemistry, pp. 13-21
- Mineral content of milk. In: Tocci, Chemistry, pp. 16-17
- Topics and questions for investigation in chemistry - ascorbic acid, caffeine, milk, colloids, artificial sweeteners and crystallization. In: Tocci, Chemistry, pp. 30-31

MILKY WAY (ASTRONOMY)

See GALAXIES

MINERALOGY

- Minerals, crystals and rocks under the microscope. In: Curry, Under, pp. 80-98

MINERALOGY - TESTS

- Classifying rocks. In: Challand, ...Earth Sciences, pp. 20-21, 88-89

MIRRORS

- Grinding telescope mirrors. In: Traister, Astronomy, pp. 121-127
- How to see through a solid brick wall -- a mirror construction. In: McGill, Science, pp. 136-137
- Magic mirror -- two mirrors back-to-back in a box provide demonstration of light reflection. In: McGill, Science, pp. 133-134
- Mirrors. In: Cooper, How Everyday, pp. 38, 40-41
- Properties of light: pin hole camera, inverse square law, mirrors (brief descriptions). In: Hilton, Physics, pp. 69-70
- The "seebackascope". In: McGill, Science, pp. 134-135
- The water mirror. In: McGill, Science, p. 131

MITOSIS

- Discovering the areas of mitosis in stems and roots. In: Challand, ...Life Sciences, pp. 35, 85

MIXTURES

- Separating salt and sand. In: Jennings, Everyday Chemicals, p. 29

MÖBIUS STRIP

MÖBIUS STRIP

Moebius strip. In: Scienceworks, p. 34

MODULATION (ELECTRONICS)

Basic pulse-frequency modulation for use with fiber-optics systems.

In: Boyd, Fiber, pp. 115-118

Multitone modulation of digital transmission -- fiber optics pulse transmission system. In: Boyd, Fiber, pp. 112-114

Pulse-frequency modulation: to demonstrate "successful transmission and reception of digital pulse-frequency voice modulation over a fiber-optic link". In: Boyd, Fiber, pp. 119-123

MOISTURE

Aquarium leakage monitor. In: Greene, Quick-N-Easy, pp. 48-49

Demonstrations to show that air moves, heat causes air to expand, air contains moisture, that warm air holds more moisture than cold air, and that air holds some things up. In: U.S. Department of Transportation, Aviation, pp. 5-9

Investigations of various aspects of weather - experiments involving wind, thermometers and air temperature, rays of the sun, moisture in the air, and atmospheric pressure. In: U.S. Department of Transportation, Aviation, pp. 19-33

Moisture detection circuits. Computers & Electronics, Jan. '84, p. 96

MOLDS (BOTANY)

Growing a garden of molds. In: Challand, ...Life Sciences, pp. 14-15

MOLECULES - MODELS

Make a molecular model. In: Chisholm, Introduction, pp. 32-33

MOMENTS OF INERTIA

Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

MOMENTUM (MECHANICS)

Momentum: introductory demonstrations, bowling balls, conservation of momentum, air track and air table experiments, etc. In: Hilton, Physics, pp. 15-17

MOON

Determination of the speed of light through measuring lunar trigonometric parallax and radar travel time to the moon (data given). In: Culver, Introduction, pp. 1-9

How does the shape of the moon seem to change? In: Jacobson, Science, pp. 188-189

Lunar occultations. In: Sherrod, Complete Manual, pp. 121-139, 281

Lunar topography. In: Sherrod, Complete Manual, pp. 103-120

Measuring the size of the moon. In: Challand, ...Earth Sciences, p. 38

The moon, including some photography hints. In: Mayer, Starwatch, pp. 136-137

Showing the phases of the moon. In: Challand, ...Earth Sciences, pp. 39, 83

MORAINES

See GLACIERS

MORSE CODE

Code practice oscillator. In: Greene, Quick-N-Easy, pp. 43-45
 Practice Morse code keyer. In: Greene, Quick-N-Easy, pp. 93-95
 Semiautomatic code keyer. In: Hawkins, Digital, pp. 144-148

MOSES

Growing the life cycle of a moss. In: Challand, ...Life Sciences,
 p. 12

MOTHBALLS

Bouncing mothballs. In: Gardner, Kitchen, pp. 84, 86
 Restless mothball demonstration. In: McGill, Science, p. 65
 The roaming mothball. Sci Teach, Dec. '85, pp. 46, 48
 Scientific centrepiece - rising and sinking mothballs. In: Scienceworks,
 p. 86
 Various experiments showing how acids and alkalis behave and tests to
 distinguish between them -- fizzy lemonade, invisible ink, dancing
 mothballs, indicators. In: Watson, Liquid, pp. 32-35

MOTION

Newton's First Law of Motion: tablecloth experiment, ball and moving
 car, water hammer, a body at rest, and hit the nail on the head. In:
 Hilton, Physics, pp. 5-6
 Newton's Third Law of Motion: forces exist in pairs, train on a circular
 track, mass under spring tension, falling water, etc. (brief information).
 In: Hilton, Physics, pp. 7-8
 Our perceptions of motion - optical illusions involving motion or perceived
 motion. In: Cobb, How to, pp. 83-107
 Simple harmonic motion - pendulums, Lissajous figures, oscillators
 (brief information). In: Hilton, Physics, pp. 34-36 and also
 pp. 13-14, 21

MOTION PICTURES

See MOVING PICTURES

MOTOR ABILITY

See also CO-ORDINATION (PHYSIOLOGY)

No sign of a signature - trying to write your name and trace circles
 on the floor with a foot. In: Cobb, How to, pp. 25-27

MOTORS

How to make a simple magnet motor. In: Jacobson, Science, p. 145

MOUTHWASHES

Do mouthwashes really kill bacteria? Mouthwashes and disinfectants
 are good subjects for science fair projects, but students must be
 careful to judge effectiveness correctly. Sci Teach, Sept. '84, pp. 34-40

MOVING PICTURES

MOVING PICTURES

Mini-movie -- demonstrating principle of moving pictures using a toy called a thaumatrope. In: Scienceworks, p. 47

Motion pictures - elementary general discussion, including mention of film sound tracks. In: Cooper, How Everyday, pp. 36-37

MUSCLES

Do you think skeletal or cardiac muscle is stronger - simple demonstration involving squeezing a rubber ball. In: Challand, ...Life Sciences, pp. 69, 87

How do various muscle pairs operate? In: Jacobson, Science, pp. 108-109

How to keep from kidding yourself - covert muscle tension causes pendulum to swing. In: Cobb, How to, pp. 23-25

MUSHROOMS

Making spore prints of mushrooms. In: Challand, ...Life Sciences, p. 13

MUSIC

Ardley, Sound and Music.

-short book, with experiments, on such topics as producing, hearing, amplifying and transmitting sound; sound speed; pitch and musical sounds (including the sounds of various instruments)

Beats; Doppler effect; musical acoustics (brief information). In: Hilton, Physics, pp. 46-48

Short and simple discussion of different ways of producing musical sounds and of storing them. In: Kent, Introduction, pp. 20-21

MUSICAL INSTRUMENTS

Ardley, Sound and Music.

-short book, with experiments, on topics such as producing, hearing, amplifying and transmitting sound; sound speed; pitch and musical sounds (including the sounds of various instruments)

Group of acoustic demonstrations, including "visible sound vibrations," "musical bottle," "musical glass," tuning a guitar without using your ears, sound magnification with a balloon, and making an Aeolian harp and the "magical humming glass". In: McGill, Science, pp. 92-99

. MUSICAL INSTRUMENTS, ELECTRONIC

Integrated-circuit pocket organ. In: Traister, Third, pp. 13-14

MUSICAL PITCH

Group of acoustic demonstrations, including "visible sound vibrations," "musical bottle," "musical glass," tuning a guitar without using your ears, sound magnification with a balloon, and making an Aeolian harp and the "magical humming glass". In: McGill, Science, pp. 92-99

Why do things make sounds? Vibrations; how sound travels (making a simple string telephone); high sounds and low sounds. In: Wilkes, Simple, pp. 26-27

NEBULAE

The Crab Nebula pulsar -- investigation of some of its properties (data given). In: Culver, Introduction, pp. 160-166

NEBULAE (continued)

The Wolf diagram for the Horsehead Nebula (data given). In: Culver, Introduction, pp. 118-124

NEPHOSCOPE

See CLOUDS

NEPTUNE (PLANET)

The trans-Uranian planet: a simplified version of the calculation used to predict the existence of Neptune (data given). In: Culver, Introduction, pp. 23-29

NERVES

Charting nerve endings in the skin. In: Challand, ...Life Sciences, p. 78

Checking the temperature receptors in skin using containers with water of different temperatures. In: Challand, ...Life Sciences, p. 79

Hot or cold trick - can water be hot and cold at the same time?

In: Scienceworks, p. 63

Hot spots and cold spots - our bodies have special receptors that can be mapped. In: Scienceworks, p. 66

How can we investigate nerve reflexes? In: Jacobson, Science, pp. 110-111

NEUTRALIZATION (CHEMISTRY)

Acids, bases and salts; testing acids and alkalis; neutralization reactions; etc. In: Chisholm, Introduction, pp. 28-29

NEWTON'S FIRST LAW OF MOTION

See INERTIA (MECHANICS); MOTION

NEWTON'S SECOND LAW OF MOTION

See FORCE AND ENERGY

NEWTON'S THIRD LAW OF MOTION

See MOTION

NICKEL

Determination of nickel in steel. In: Day, Quantitative, pp. 584-585

Electroplating, using nickel and copper. In: Cobb, Chemically Active, pp. 96-100

Foiled again - electrochemistry experiment with nickel and copper.

Sci Teach, Sept. '85, pp. 27-29

Separation of copper and nickel by electrolysis. In: Day, Quantitative, pp. 623-624

NITRATION (CHEMISTRY)

Nitration of anilines: use of a protecting group. Includes instructions for acetylation of aniline in water and in acetic acid and direct acetylation with acetic acid. Also discussion of nitration of acetanilide and deacetylation with preparation instructions for p-nitroacetanilide and p-nitroaniline. In: Wilcox, Experimental, pp. 324-330

Nitration of aromatic compounds, including discussion of mechanism and preparation of m-dinitrobenzene, p-bromonitrobenzene, and methyl m-

NITRATION (CHEMISTRY)

NITRATION (CHEMISTRY) (continued)

nitrobenzoate. In: Wilcox, Experimental, pp. 318-323

NITRILES

Amide and nitrile test. In: Wilcox, Experimental, pp. 147-149

NITRITES

Spectrophotometric determination of nitrite in water. In: Day, Quantitative, pp. 606-608

NITRO COMPOUNDS

See e.g., NITRATION (CHEMISTRY); NITROBENZENES

NITROBENZENES

Nitration of aromatic compounds, including discussion of mechanism and preparation of m-dinitrobenzene, p-bromonitrobenzene, and methyl m-nitrobenzoate. In: Wilcox, Experimental, pp. 318-323

NITROBENZOIC ACIDS

See BENZOIC ACID

NITROGEN

Element identification -- carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131

Producing a relatively pure sample of nitrogen. In: Cobb, Chemically Active, pp. 72-74 and also pp. 44-45

Sodium fusion to test for sulfur, nitrogen and halogens in organic compounds. In: Wilcox, Experimental, pp. 131-133

NITROGEN COMPOUNDS

Kjeldahl nitrogen analysis. In: Harris, Quantitative, pp. 620-622

Spectrophotometric determination of nitrite in water. In: Day, Quantitative, pp. 606-608

NONNUTRITIVE SWEETENERS

See ARTIFICIAL SWEETENERS

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

Nuclear magnetic resonance. In: Wilcox, Experimental, pp. 197-211

NUCLEIC ACIDS

Brief suggestions for investigations in the areas of petroleum chemistry, water electrolysis, electroplating, and recombinant DNA. In: Tocci, Chemistry, pp. 148-149

Sizing up DNA -- using yarn to make models. Sci Teach, Mar. '85, pp. 53-55

NUMBERS

Magic with numbers: various tricks and demonstrations with numbers and arithmetic. In: McGill, Science, pp. 30-50

NUMBERS, RANDOM

Random numbers and the computer. Computers & Electronics, Nov. '84, pp. 14, 20, 24, 26, 28, 105

NUMERATION

- Digital counter demonstrator. In: Hawkins, Digital, pp. 88-101
- Mini recounter. In: Greene, Quick-N-Easy, pp. 66-67
- Modular decade counter. In: Hawkins, Digital, pp. 102-119

NUTRITION

- Topics and questions for investigation in chemistry -- ascorbic acid, caffeine, milk, colloids, artificial sweeteners, and crystallization. In: Tocci, Chemistry, pp. 30-31
- What foods are eaten by the children in a group? In: Jacobson, Science, pp. 117-118

NUTS

- Specifics of propagation: fruits & nuts; trees, shrubs, and vines; herbaceous plants. In: Hill, Secrets, pp. 119-156

OBSERVATORIES

- See ASTRONOMICAL OBSERVATORIES

OCCULTATIONS (ASTRONOMY)

- See MOON

OHMMETER

- Audible ohmmeter. In: Hawkins, Digital, pp. 81-87
- Super simple tester - an electronic type of ohmmeter. In: Traister, Third, pp. 46-47

OILS AND FATS

- Background information on fats; testing oils for degree of saturation; and testing hamburgers for fat content. In: Tocci, Chemistry, pp. 37-43
- Fats and margarines: what are polyunsaturates? Testing using iodine and an organic solvent. In: Chisholm, Introduction, p. 35
- How thick can oil get? In: Tocci, Chemistry, pp. 139-142

- OLEOMARGARINE

- See MARGARINE

OPTICAL ILLUSIONS

- See also ILLUSIONS

- Color illusions and other optical illusions: case of the bulging borders; the Hermann grid; the cornsweet illusion; Meyer's experiment; Benham's top and other spinoffs; Purkinje effect. In: Cobb, How to, pp. 70-82
- Exploring optical illusion using the Benham's disk; general discussion of optical illusions with two pages of diagrams of illusions. In: Science Activities, pp. 65-68
- Eye tricks. In: Scienceworks, p. 60
- How to stop a spinning object by humming and perceive curious blue arcs around a light; stroboscopic effects. Sci Am, Feb. '84, pp. 136-138, 140-141, 143-144, 148

OPTICAL ILLUSIONS

OPTICAL ILLUSIONS (continued)

- The incredible shrinking cube. In: Cobb, How to, pp. 16-17
- Mirages, afterimages, a hole in your hand, the flattened sun, and other illusions. In: Cobb, How to, pp. 108-127
- Retardation experiment - vibrating meter stick appears to move in an ellipse. In: Hilton, Physics, p. 88
- Tests: memory, audio-visual reaction time, hand-eye coordination, centering ability, optical illusion, etc. Computers & Electronics, Feb. '85, pp. 22-24, 84-85, 88
- Various optical illusions involving lines and other forms, including the moon illusion and the Ames window. In: Cobb, How to, pp. 52-69

OPTICS

- Retardation experiment - vibrating meter stick appears to move in an ellipse. In: Hilton, Physics, p. 88

ORBITS

- How to orbit the earth -- need only simple high school math to show how satellites, Skylab, and the space shuttle stay in their orbits. Sci Teach, Jan. '84, pp. 55-56

ORIENTATION

- Using the sun to find direction. In: Adams, Catch, pp. 60-61

OSAZONE TEST

- See SUGARS

OSCILLATORS, CRYSTAL

- Crystal-controlled oscillator. In: Traister, Third, pp. 19-23

OSCILLATORS, ELECTRIC

- Code practice oscillator. In: Greene, Quick-N-Easy, pp. 43-45
- Deluxe code oscillator. In: Hawkins, Digital, pp. 70-75

OSCILLOGRAPH

- DC input circuit for an oscilloscope. In: Traister, Second, pp. 78-79
- Exploring sound with a simple homemade oscilloscope; also general information about sound such as method of travel, speed, and Doppler effect. In: Science Activities, pp. 37-40
- Oscilloscope adjuster. In: Greene, Quick-N-Easy, pp. 54-55
- Use your TRS-80 color computer as a storage oscilloscope. Computers & Electronics, Feb. '84, pp. 64-66, 98-101

OSCILLOSCOPE

- See OSCILLOGRAPH

OSMOSIS

- Bouncing peas -- dried peas absorb water. In: Watson, Liquid, p. 11
- Exploring osmosis using an egg; also general discussion of osmosis. In: Science Activities, pp. 41-44
- Observing osmosis. In: Challand, ...Life Sciences, pp. 30, 85

OXALATES

Determination of an oxalate. In: Day, Quantitative, pp. 588-589

OXIDATION

"Burning" steel -- experimenting with the rusting of steel wool.

In: Cobb, Chemically Active, pp. 67-71

Preparation of aldehydes and ketones by oxidation, including a discussion of chromic acid oxidation of alcohols and preparations of 2-pentanone and cyclohexanone. In: Wilcox, Experimental, pp. 276-280

Side-chain oxidation of aromatic compounds, including preparation of p- and o-nitrobenzoic acids. In: Wilcox, Experimental, pp. 310-311

OXIDATION-REDUCTION REACTION

Electron flow between iron and copper. In: Tocci, Chemistry, pp. 144-146

Redox titrations to illustrate the potentiometric technique - titration of iron(II) with dichromate or cerium(IV) solution. In: Day, Quantitative, pp. 615-616

OXYGEN

Candle experiments -- observation of the flame and of the wick, burning a candle under a jar. In: Gardner, Kitchen, pp. 87-98

Changing water to gases with electricity. In: Gardner, Kitchen, pp. 111-114

Determination of oxygen in pyrolusite (manganese dioxide ore). In: Day, Quantitative, pp. 592-593

Electrolysis of water. In: Walters, Chemistry, p. 26

Element identification -- carbon, hydrogen, oxygen, nitrogen, halogens, sulfur. In: Wilcox, Experimental, pp. 129-131

Green plants make oxygen. In: Jennings, Everyday Chemicals, pp. 12-13

Oxygen and a burning candle; also experiment using steel wool. In: Gardner, Kitchen, pp. 94-98

Splitting water and testing the products. In: Cobb, Chemically Active, pp. 61-67

Testing gases plants give off. In: Challand, ...Life Sciences, pp. 23, 83

PABA (p-AMINOBENZOIC ACID)

See BENZOIC ACID

PAINT

Paints. In: Cobb, Secret, pp. 21-30

p-AMINOBENZOIC ACID

See BENZOIC ACID

PAPER

Don't throw in the towel - test it! Experimenting with paper towels.

Sci Teach, Apr. '84, pp. 28-29

How things burn; weighing the ash -- when paper and magnesium are burned, is the ash produced heavier or lighter. In: Walters, Chemistry, pp. 6-7

Making new paper from old (recycling); general information on papermaking history and manufacture. In: Science Activities, pp. 57-60

PAPER

PAPER (continued)

Who can make the strongest recycled paper? In: U.S. Department of Energy, Science, pp. [15-16], and see also teacher's guide

PAPER CHROMATOGRAPHY

How can we separate different colours? In: Jennings, Everyday Chemicals, pp. 29-30

How color spots from ink and from food color react to various liquids rising up strips of paper. In: Zubrowski, Ball-Point Pens, pp. 34-37

Separating components of chlorophyll from leaves using paper chromatography. In: Tocci, Chemistry, pp. 178-180

Separating things - through evaporation; use of magnets, distillation, chromatography. In: Chisholm, Introduction, pp. 10-11

Spreading and rising inks - components of ink separate as they spread on paper. In: Watson, Liquid, pp. 12-13

PARACHUTES

Air is real; the wind; parachute tests. In: Wilkes, Simple, pp. 6-7

Letting paper fall through the air; making your own parachute; pushing things through the air. In: Fitzpatrick, In the Air, pp. 12-17

PARAFFINS

"Dry sand" demonstration involving coating sand with paraffin and placing coated sand in water. In: McGill, Science, pp. 72-73

PARALLAX

Method of spectroscopic parallax - using given spectra to determine distance and parallax of a star. In: Culver, Introduction, pp. 94-100

PEAS

Bouncing peas - dried peas absorb water. In: Watson, Liquid, p. 11

PENDULUM

Conservation of energy -- tracks, pendulums, springs (brief information). In: Hilton, Physics, pp. 13-15

How can we measure time? Construction of a pendulum. In: Jacobson, Science, pp. 192-193

- How to keep from kidding yourself - covert muscle tension causes pendulum to swing. In: Cobb, How to, pp. 23-25

Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

Ride-on physics: physics at the amusement park -- acceleration, pendulum action, lenses. Sci Teach, Oct. '84, pp. 36-40

Strange things happen when two pendulums interact through a variety of interconnections. Sci Am, Oct. '85, pp. 176-180, 184

PEPTIDES

Peptides -- structure, biological function, general discussion of polypeptide synthesis and instructions for the preparation of phthaloylglycylglycine. In: Wilcox, Experimental, pp. 432-436

PERIODIC TABLE OF THE ELEMENTS

See CHEMICAL ELEMENTS

PERISCOPES

The periscope. In: McGill, Science, pp. 135-136

Seeing around corners - making a periscope. In: Scienceworks, p. 74

PERMANGANATES

Hydrocarbon testing - permanganate test (Baeyer test), bromine test, Friedel-Crafts test. In: Wilcox, Experimental, pp. 150-153

Preparation of a 0.1N potassium permanganate solution. In: Day, Quantitative, p. 586

Standardization of potassium permanganate solution. In: Day, Quantitative, pp. 586-588

PETROLEUM

Brief suggestions for investigations in the areas of petroleum chemistry, water electrolysis, electroplating and recombinant DNA. In: Tocci, Chemistry, pp. 148-149

Separating the parts in alcohol by distillation. Can several liquids be separated by fractional distillation? Background information on fractional distillation of petroleum. In: Tocci, Chemistry, pp. 135-140

PHENACETIN

Preparation of phenacetin. In: Wilcox, Experimental, pp. 333-334 and chapter 29

PHENANTHRENE

Polycyclic quinones - general discussion, and instructions for preparation of anthraquinone and phenanthrenequinone. In: Wilcox, Experimental, pp. 378-382

PHENOLPHTHALEIN

See INDICATORS AND TEST PAPERS

PHENOLS

Ferric complex color test for phenols and related compounds. In: Wilcox, Experimental, pp. 149-150

. PHEROMONES

Pheromones and insect repellents - general discussion of pheromones and repellents and instructions for preparation of the insect repellent N,N-diethyl-m-tolamide. In: Wilcox, Experimental, pp. 369-372

PHONOGRAPH

See also SOUND - RECORDING AND REPRODUCING

Record player - making a record, playing a record, digital recording, compact discs (very general elementary discussion). In: Cooper, How Everyday, pp. 45-47

PHOTOCHEMISTRY

Lighter side of chemistry - photochemistry: ferrioxalate, using titanium to make a photoelectrochemical cell, fluorescence. Sci Teach, Dec. '84, pp. 25-28

Photochemistry, including how to make a photographic wet plate and

PHOTOCHEMISTRY

PHOTOCHEMISTRY (continued)

investigation of leaves. In: Cobb, Chemically Active, pp. 135-137

PHOTOELECTRIC DEVICES

Analog sensors for personal computers - how personal computer with analog to digital converter is able to expand capabilities of simple circuit: light meters, etc. Computers & Electronics, Feb. '84, pp. 82, 84-88, 90

Burgle-proof: making a simple light-controlled burglar alarm. Sci Teach, Sept. '85, pp. 27-29

Camera flasher - photographic timing device. In: Greene, Easy, pp. 43-45

Computer controlled light meter. Computers & Electronics, Aug. '84, pp. 18, 21-22, 76-77

Convenience lighting - one light going off will cause another to come on. In: Greene, Easy, pp. 52-53

How much light does a bulb give off from a distance of one foot compared to a distance of three feet? Includes instructions on making a light meter. In: U.S. Department of Energy, Science, pp. [9-10], and see also teacher's guide

Light-intensity-level Wheatstone bridge. In: Graf, One, pp. 89-94

Optoelectronic digitizer. Computers & Electronics, Dec. '84, pp. 22-23, 26, 28

Solar clock. In: Greene, Easy, pp. 54-55

Solar flasher. In: Greene, Easy, pp. 62-63

Sun spotter - electronic device with flashing lights. In: Greene, Quick-N-Easy, pp. 76-77

PHOTOELECTRICITY

Some brief and general information on atomic and nuclear physics including Brownian motion, crystal models, the Millikan oil drop experiment, the photoelectric effect, atomic structure, electromagnetic waves, vacuum tubes including triodes, etc. In: Hilton, Physics, pp. 89-98

PHOTOGRAPHY - APPARATUS AND SUPPLIES

Camera flasher - photographic timing device. In: Greene, Easy, pp. 43-45

PHOTOGRAPHY - DEVELOPING AND DEVELOPERS

Darkroom timer with beep alarm. In: Hawkins, Digital, pp. 170-187

PHOTOGRAPHY - FILMS

Cameras and films - elementary general discussion. In: Cooper, How Everyday, pp. 30-33

Photochemistry, including how to make a photographic wet plate and investigation of leaves. In: Cobb, Chemically Active, pp. 135-137

PHOTOMETRY

An introduction to photoelectric photometry. In: Sherrod, Complete Manual, pp. 224-239

Photometric astronomy - determination of the magnitude of a star by photographic methods (data given). In: Culver, Introduction, pp. 16-22

Visual photometry of the minor planets. In: Sherrod, Complete Manual, pp. 192-201, 285

PHOTOMICROGRAPHY

Photography through the microscope. In: Curry, Under, pp. 99-108

PHOTOSYNTHESIS

Exploring photosynthesis. In: Tocci, Chemistry, pp. 177-178

Getting raw materials into a plant -- experiment involving coating some leaves. In: Challand, ...Life Sciences, pp. 26-27, 84

Photosynthesis in two acts. Sci Teach, Dec. '84, pp. 51-52

Providing raw materials for photosynthesis. In: Challand, ...Life Sciences, pp. 22, 83

Testing gases plants give off. In: Challand, ...Life Sciences, pp. 23, 83

PHOTOTROPISM

Discovering how plants, including seeds, react - thigmotropism, phototropism, hydrotropism, chemotropism, geotropism. In: Challand, ...Life Sciences, pp. 32-33

PHTHALATES (CHEMISTRY)

Determination of the purity of potassium acid phthalate. In: Day, Quantitative, p. 569

Standardization of sodium hydroxide solution with potassium acid phthalate. In: Day, Quantitative, p. 567

PHYSICAL MEASUREMENTS

How to use unconventional units such as paper clips for measurement. In: Jacobson, Science, p. 163

Measuring the height of trees using various techniques -- 11 to 1 method, shadow method, triangulation, and the artist's method.

In: Challand, ...Life Sciences, pp. 38-40

Measuring the slope of a hill. In: Challand, ...Earth Sciences, pp. 18-19

PHYSICS

Statics and the walkways collapse. Sci Teach, Oct. '84, p. 59

PINACOL-PINACOLONE REARRANGEMENT

The pinacol-pinacolone rearrangement -- general discussion, and instructions on preparation of benzopinacol by photochemical reduction and the production of benzopinacolone. In: Wilcox, Experimental, pp. 373-377

PLANARIA

See TURBELLARIA

PLANETARIA

A planetarium for the amateur astronomer. In: Hilton, Physics, pp. 75-76

A planispheric planetarium for the astronomy club. In: Hilton, Physics, p. 76

Turning a classroom into a planetarium. Sci Teach, Sept. '84, p. 63

PLANETS

See also names of specific planets

Building planet models. In: Challand, ...Earth Sciences, pp. 40-41

Planets: the wanderers -- how do planets' positions change? In:

PLANETS

PLANETS (continued)

- Jacobson, Science, pp. 194-195
- The trans-Uranian planet: a simplified version of the calculation used to predict the existence of Neptune (data given). In: Culver, Introduction, pp. 23-29
- Visual photometry of the minor planets. In: Sherrod, Complete Manual, pp. 192-201, 285

PLANKTON

- Making a plankton dip net and identifying the plants and animals gathered. In: Challand, ...Earth Sciences, pp. 22-23

PLANTS

See also PHOTOSYNTHESIS

- Brief suggestions for science explorations in the areas of plant growth and chromatography. In: Tocci, Chemistry, pp. 180-181
- Discovering how plants, including seeds, react - thigmotropism, phototropism, hydrotropism, chemotropism, geotropism. In: Challand, ...Life Sciences, pp. 32-33, 85
- Exploring stems - investigating what stems do for plants. In: Jacobson, Science, pp. 8-9
- Exploring swamp life in a muskrat nest blind, including suggestions of swamp projects. In: Brown, Investigating, pp. 215-219
- Extracting dyes from plants. In: Challand, ...Life Sciences, p. 18
- Finding out about simple plants - yeast, bacterial cultures, moss, fungi, spores, molds. In: Challand, ...Life Sciences, pp. 9-15
- Getting raw materials into a plant - experiment involving coating some leaves. In: Challand, ...Life Sciences, pp. 26-27, 84
- Investigation of kinds of plants to be found in local community. In: Jacobson, Science, pp. 3-4
- Making a plankton dip net and identifying the plants and animals gathered. In: Challand, ...Earth Sciences, pp. 22-23
- Plant propagation: dividing plants, layering (tip, compound, stool and air layers), cuttings, grafting, bud grafting, tissue culture. In: Hill, Secrets, pp. 52-115
- Specifics of propagation: fruits & nuts; trees, shrubs and vines; herbaceous plants. In: Hill, Secrets, pp. 119-156
- Succession of plants and animals - the way plants and animals change as conditions in their environment change. In: Brown, Investigating, pp. 155-163
- Wild garden and special herb garden; how to press and identify plants; photographing flowers; projects with wild flowers; etc. In: Brown, Investigating, pp. 223-241
- Wild marshmallows: wild food plants grow outside school's doors. Harvest some for a biology course. Sci Teach, May '84, pp. 46-52

PLANTS - ABSORPTION OF WATER

- Water-flow-up-tree mystery -- demonstration with celery stalk and colored water. In: Scienceworks, p. 35

PLANTS - COLLECTION AND PRESERVATION

- Drying plants for a collection using a microwave oven. Sci Teach, Mar. '84, p. 62

PLANTS - COLLECTION AND PRESERVATION (continued)

Drying plants for a collection using a microwave oven. Sci Teach, May '84, p. 85

PLANTS - REPRODUCTION

Growing plants from cuttings. In: Jacobson, Science, pp. 10-11
Making spore prints of mushrooms. In: Challand, ...Life Sciences, p. 13
A plant from a potato. In: Jacobson, Science, pp. 12-13
Plant propagation: dividing plants, layering (tip, compound, stool and air layers), cuttings, grafting, bud grafting, tissue culture.
In: Hill, Secrets, pp. 52-115
Studying pollen. In: Challand, ...Life Sciences, p. 16

PLANTS - RESPIRATION

Finding out that plants breathe. In: Challand, ...Life Sciences, p. 26
Testing gases plants give off. In: Challand, ...Life Sciences, pp. 23, 83

PLANTS - TRANSPIRATION

Observing transpiration. In: Challand, ...Life Sciences, pp. 27, 84

PLANTS, EFFECT OF LIGHT ON

Green plants make oxygen. In: Jennings, Everyday Chemicals, pp. 12-13
Photosynthesis in two acts. Sci Teach, Dec. '84, pp. 51-52
Providing raw materials for photosynthesis. In: Challand, ...Life Sciences, pp. 22, 83
Testing the effect of heat and light on germination. In: Challand, ...Life Sciences, pp. 36, 85

PLANTS, EFFECT OF TEMPERATURE ON

Testing the effect of heat and light on germination. In: Challand, ...Life Sciences, pp. 36, 85

PLASMOLYSIS

See CELLS

PLASTER OF PARIS

Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63

PLASTICS

Identifying plastics - a few simple questions and tests. In: Chisholm, Introduction, p. 34
Measuring strength of a plastic pen. In: Zubrowski, Ball-Point Pens, pp. 38-39

POLARIMETER

See POLARISCOPE

POLARISCOPE

Making a polarimeter and exploring light with it; showing how light is polarized; general information on nature and behavior of light.
In: Science Activities, pp. 45-48

POLARITY (ELECTRICITY)

POLARITY (ELECTRICITY)

LED voltage and polarity indicator - operates over range 2 to 115 volts ac or dc. In: Graf, One, pp. 41-50

Polarity-sensing continuity tester using LED's. In: Graf, One, pp. 79-88

The Probevolt voltage detector with an autopolarity feature - works on ac and dc voltages of from 1 to 50 volts. In: Graf, One, pp. 25-40

POLARIZATION (LIGHT)

Making a polarimeter and exploring light with it; showing how light is polarized; general information on nature and behavior of light. In: Science Activities, pp. 45-48

Polarization - polarization by reflection, retardation plates, etc. In: Hilton, Physics, pp. 83-85

POLAROGRAPH AND POLAROGRAPHY

Polarographic measurement of an equilibrium constant. In: Harris, Quantitative, pp. 629-631

POLISHES

Surface stuff: cleaners, polishes, waxes -- hard-surface cleaners, wetting agents, cleaning metal surfaces, photochemistry, waxes, etc. In: Cobb, Secret, pp. 4-20

POLLEN

Studying pollen. In: Challand, ...Life Sciences, p. 16

POLLUTION

Investigating acid rain. In: Tocci, Chemistry, pp. 153-160

PONDS

Ponds, streams and freshwater aquariums, including projects for ponds and freshwater aquariums; maintaining an aquarium; projects in running waters of streams. In: Brown, Investigating, pp. 173-186

POROSITY

Rock porosity and scientific methodology. Sci Teach, Dec. '84, p. 49

POTASSIUM COMPOUNDS

Changing two liquids to a solid using calcium chloride and potassium carbonate. In: McGill, Science, p. 66

Color changing powder - demonstration of color change on mixing of potassium iodide and lead nitrate. In: McGill, Science, pp. 63-64

Determination of the purity of potassium acid phthalate. In: Day, Quantitative, p. 569

Preparation and standardization of a 0.1N potassium dichromate solution. In: Day, Quantitative, pp. 595-596

Standardization of sodium hydroxide solution with potassium acid phthalate. In: Day, Quantitative, p. 567

POTASSIUM NITRATE

Growing crystals using copper sulphate, chrome alum, potassium nitrate, or magnesium sulphate. In: Jennings, Everyday Chemicals, pp. 24-25

POTASSIUM THIOCYANATE

Preparation of 0.1M solutions of silver nitrate and potassium thiocyanate.

In: Day, Quantitative, pp. 573-574

Standardization of silver nitrate and potassium thiocyanate solutions (Mohr and Fajans methods). In: Day, Quantitative, pp. 574-575

POTATOES

A plant from a potato. In: Jacobson, Science, pp. 12-13

POTENTIOMETRY (CHEMISTRY)

Acid-base potentiometric titrations. In: Day, Quantitative, pp. 612-615

Identification of an amino acid. In: Day, Quantitative, pp. 617-621

Potentiometric halide titration with Ag^+ . In: Harris, Quantitative, pp. 627-628

Precipitation titrations -- potentiometric determination of chloride and of a chloride-iodide mixture. In: Day, Quantitative, pp. 616-617

Redox titrations to illustrate the potentiometric technique - titration of iron(II) with dichromate or cerium(IV) solution. In: Day, Quantitative, pp. 615-616

POWDERS

Testing some common powders. In: Jennings, Everyday Chemicals, pp. 27-28

POWER (MECHANICS)

How much horsepower can you produce? In: U.S. Department of Energy, Science, p. [3], and also see teacher's guide

POWER RESOURCES

Add-on zener diode regulator. In: Traister, 32 Electronic, pp. 149-153

Altering secondary voltage. In: Traister, 32 Electronic, pp. 281-284

Another high voltage power supply. In: Traister, 32 Electronic, pp. 244-252

Breadboard with power supply. In: Hawkins, Digital, pp. 120-124

Construction details for experimenter's AC power supply. In: Math, Wires, pp. 22-23

DC power supplies -- how they work; a simple regulated supply; electronic regulation; a practical supply. In: Traister, Third, pp. 1-7

DC to DC power supply. In: Traister, 32 Electronic, pp. 252-257

A different type of variable supply. In: Traister, 32 Electronic, pp. 275-277

Drawing, circuit diagram and construction details for DC power supply. In: Math, Wires, pp. 20-21

Dry cell replacement using IC regulators. In: Traister, 32 Electronic, pp. 196-199

Dual-polarity regulated 15-volt supply. In: Traister, 32 Electronic, pp. 158-163

Dual voltage power supply. In: Traister, 32 Electronic, pp. 153-157

Electronic power supplies for your projects. In: Traister, Second, pp. 16-23

5/12 power -- power supply provides five or twelve volts of DC electricity. In: Greene, Quick-N-Easy, pp. 80-81

5-VDC 1-ampere IC supply. In: Traister, 32 Electronic, pp. 199-202

Free electricity power supply. In: Traister, 32 Electronic, pp. 264-267

Full-wave bridge supply. In: Traister, 32 Electronic, pp. 146-149

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POWER RESOURCES (continued)

- Full-wave center-tapped supply. In: Traister, 32 Electronic, pp. 142-146
- Full-wave voltage tripler supply. In: Traister, 32 Electronic, pp. 180-183
- Half-wave power supply. In: Traister, 32 Electronic, pp. 136-142
- High voltage DC power supply. In: Traister, 32 Electronic, pp. 232-244
- Integrated-circuit, dual-voltage power supply. In: Traister, Second, pp. 24-31
- IC-controlled variable voltage supply. In: Traister, 32 Electronic, pp. 211-216
- Multi-output, add-on regulator. In: Traister, 32 Electronic, pp. 187-190
- 9-volt series-regulated supply. In: Traister, 32 Electronic, pp. 163-170
- One amp power supply. In: Greene, Quick-N-Easy, p. 86
- Power failure backup. In: Greene, Quick-N-Easy, pp. 46-47
- Power supply/battery charger. In: Traister, 32 Electronic, pp. 170-174
- Regulated battery pack. In: Greene, Easy, p. 42
- Series-regulated dual-polarity supply. In: Traister, 32 Electronic, pp. 202-205
- Simple battery holder for D cells. In: Math, Wires, p. 16
- 600 VDC without a transformer. In: Traister, 32 Electronic, pp. 209-211
- Solar power supply. In: Traister, 32 Electronic, pp. 216-228
- Surge protection for medium to high voltage power supplies. In: Traister, 32 Electronic, pp. 228-232
- Switchable full/half-voltage power supply. In: Traister, 32 Electronic, pp. 183-186
- 300 VDC without a transformer. In: Traister, 32 Electronic, pp. 206-209
- Transceiver power supply. In: Traister, 32 Electronic, pp. 190-196
- 12-volt inverter circuit. In: Traister, 32 Electronic, pp. 257-264
- 28-volt power supply using three zener diodes. In: Traister, 32 Electronic, pp. 267-269
- Using a current meter to measure voltage. In: Traister, 32 Electronic, pp. 270-275
- Variable power supply. In: Greene, Easy, pp. 72-73
- Variable-voltage regulated power supply. In: Traister, Second, pp. 64-66
- Versatile voltage doubler supply. In: Traister, 32 Electronic, pp. 174-179

PRECESSION

- Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

PRECIPITATION (CHEMISTRY)

- Chemical reaction indicated by precipitate formation -- experiment with ferrous sulfate solution and tannic acid. In: Cobb, Chemically Active, pp. 54-57

PRESSURE

- Devices to show change of pressure of liquid with depth (brief information). In: Hilton, Physics, p. 24
- The troublesome teapot effect, or why a poured liquid clings to the container. Sci Am, Oct. '84, pp. 144, 146-150, 152, 154

PRISMS

Light and dark areas and rainbows created by light passing through a transparent hexagonal ball-point pen case. In: Zubrowski, Ball-Point Pens, pp. 40-43

PROBABILITIES

Counting the probability of incomplete dominance -- simulation game using colored beans to illustrate Mendelian genetics. In: Challand, ...Life Sciences, pp. 17, 83

PROTEINS

Background information on proteins; how to soften a tough protein; coagulation of protein when egg is fried; testing for protein with Biuret reagent. In: Tocci, Chemistry, pp. 47-50
The fat and protein content of milk. In: Tocci, Chemistry, pp. 18-21
Testing for proteins. In: Challand, ...Life Sciences, p. 63

PROTOZOA

Ciliates by the slice - a better way to collect ciliated protozoans. Sci Teach, Feb. '84, pp. 34-38
Finding animals in a drop of water. In: Challand, ...Life Sciences, p. 47

PSYCHOLOGICAL TESTS

Tests: memory, audio-visual reaction time, hand-eye coordination, centering ability, optical illusion, etc. Computers & Electronics, Feb. '85, pp. 22-24, 84-85, 88

PULLEYS

Pulleys and mechanical advantage. In: Jacobson, Science, pp. 175-176
Simple machines, including levers and pulleys. In: Wilkes, Simple, pp. 32-33
Static equilibrium: pulleys add a new direction to experiments that demonstrate forces. Sci Teach, Dec. '85, pp. 20-23

PULSARS (ASTRONOMY)

See STARS

PUMPING MACHINERY

Pumps, including discussions and diagrams of types of pumps. In: Cooper, How Everyday, pp. 14-15
Screws, including making a model screw pump. In: Catherall, Levers, pp. 28-32

PUZZLES

Paper puzzlers - two puzzles, one a tangram. In: Science, 52

PYROLUSITE

Determination of oxygen in pyrolusite (manganese dioxide)
Quantitative, pp. 592-593

QUASARS (ASTRONOMY)

QUASARS (ASTRONOMY)

Observations of a quasar -- investigation of some of the properties of a quasar using given data. In: Culver, Introduction, pp. 167-176

QUINONES

Diels-Alder reactions of benzoquinone. Preparations and reactions - p-benzoquinone and dihydroxytryptene. In: Wilcox, Experimental, pp. 396-401

Polycyclic quinones - general discussion, and instructions for preparation of anthraquinone and phenanthrenequinone. In: Wilcox, Experimental, pp. 378-382

RADIO

Radio -- elementary general discussion, including discussion of radio waves. In: Cooper, How Everyday, pp. 42-44

RADIO - APPARATUS AND SUPPLIES - TESTING

Radio tester. In: Greene, Easy, pp. 38-39

RADIO - RECEIVERS AND RECEPTION

A crystal-detector radio. In: Traister, Third, pp. 55-56

Crystal video receiver. In: Graf, Exploring, pp. 85-113

Improved modulator. In: Boyd, Fiber, pp. 98-103

LED-driven fiber-optic system. In: Boyd, Fiber, pp. 104-107

Light-beam voice and music modulator. In: Boyd, Fiber, pp. 87-97

Modulation monitor - device that is actually a radio receiver. In: Greene, Quick-N-Easy, p. 82

Radio -- wireless transmission experiment; construction and parts of an antenna; installing an antenna; construction details of a simple receiver and a regenerative receiver, etc. In: Math, Morse, pp. 50-61

RADIO - TRANSMITTERS AND TRANSMISSION

High SWR alarm - high SWR in a transmitting antenna can damage modern radio equipment. In: Greene, Quick-N-Easy, pp. 56-57

Improved modulator. In: Boyd, Fiber, pp. 98-103

LED-driven fiber-optic system. In: Boyd, Fiber, pp. 104-107

Light-beam voice and music modulator. In: Boyd, Fiber, pp. 87-97

Pulse-transmitting metronome circuit - experiment with a short-range transmitter. In: Traister, Second, pp. 38-42

Radio -- wireless transmission experiment; construction and parts of an antenna; installing an antenna; construction details of a simple receiver and a regenerative receiver, etc. In: Math, Morse, pp. 50-61

Radio transmitters; can hook up a key for telegraph transmissions or add a carbon microphone for voice transmissions. In: Math, Morse, pp. 68-73

RADIO, SHORT WAVE - RECEIVERS AND RECEPTION

Versatile shortwave receiver. In: Math, Morse, pp. 62-67

RADIO WAVES

Radio - elementary general discussion, including discussion of radio waves. In: Cooper, How Everyday, pp. 42-44

RADIOACTIVITY

Emanation electroscope. In: Hilton, Physics, p. 100
 Very brief discussion of some aspects of radioactivity and associated apparatus - van de Graaff machine, half-life of silver, etc. In: Hilton, Physics, pp. 101-102

RAILROADS - MODELS - ELECTRIC EQUIPMENT

Highway crossing flasher for model railroaders. In: Greene, Easy, pp. 85-87
 Model railroad semaphore signal and simple track switch using an electromagnet. In: Math, Wires, pp. 47-48

RAIN AND RAINFALL

See also SNOW

Brief suggestions for projects regarding acid rain. In: Tocci, Chemistry, pp. 162-163
 Homemade rain -- condensation demonstration simulating rain. In: Scienceworks, p. 32
 Investigating acid rain. In: Tocci, Chemistry, pp. 153-160
 Is your local rain acidic? Sci Teach, Mar. '84, p. 45
 Making a rain gauge. In: Challand, ...Earth Sciences, p. 60
 Making a rain gauge. In: Jacobson, Science, pp. 62-63
 Rain-alert microphone. In: Graf, Exploring, pp. 185-190
 Searching for patterns of rainfall in a storm. Sci Am, Jan. '85, pp. 112-113, 116-120
 Water from air; what is steam? where does rain come from? -- various demonstrations and discussions of water condensation. In: Wilkes, Simple, pp. 12-13
 Water watcher - electronic detector can be used in construction of a rain gauge, wet-basement monitor, water-level controller, etc. In: Greene, Easy, pp. 88-89
 Wide-resistance-range audio continuity tester; additional uses to detect water seepage, liquid level and rain. In: Graf, One, pp. 122-128

RAINBOW

Colored light -- making rainbows; disappearing colors -- blending colors with a spinning color wheel; making colored viewers. In: Wilkes, Simple, pp. 24-25
 Light and dark areas and rainbows created by light passing through a transparent hexagonal ball-point pen case. In: Zubrowski, Ball-Point Pens, pp. 40-43
 Making a rainbow. In: Challand, ...Earth Sciences, pp. 62, 85
 Making a rainbow - of what colors is white light composed? In: Jacobson, Science, pp. 84-85
 The prism rainbow. In: McGill, Science, p. 126
 Soap bubble spectra: easily constructed 'Rainbow Cup' -- dramatic demonstration of laws of optics in a soap bubble. Sci Teach, Jan. '84, pp. 26-27, and correction Mar. '84, p. 80

RARE ANIMALS

See ENDANGERED SPECIES

RATS

Keeping mammals; what observations can be made of, e.g., gerbils,

RATS

RATS (continued)

hamsters, mice, rats and guinea pigs. In: Jacobson, Science, pp. 37-38

REACTION TIME

Testing your reaction time. In: Challand, ...Life Sciences, p. 75

Tests: memory, audio-visual reaction time, hand-eye coordination, centering ability, optical illusion, etc. Computers & Electronics, Feb. '85, pp. 22-24, 84-85, 88

RECOMBINANT DNA

See NUCLEIC ACIDS

RECORD PLAYER

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REDUCTION, CHEMICAL

Reduction of copper oxide. Sci Teach, May '85, p. 72

REFLECTION (OPTICS)

How can the law of reflection be demonstrated? In: Jacobson, Science, pp. 81-83

How the sun's reflection from water offers a means of calculating the slopes of waves. Sci Am, June '85, pp. 130-133

Magic mirror - two mirrors back-to-back in a box provide demonstration of light reflection. In: McGill, Science, pp. 133-134

Reflection and refraction. In: Kent, Introduction, pp. 10-11

Reflections, including making a simple kaleidoscope. In: Wilkes, Simple, pp. 22-23

The "seebackscope". In: McGill, Science, pp. 134-135

Various elementary investigations of reflection using mirrors. In: Fitzpatrick, Mirrors, pp. 2-29

The water mirror. In: McGill, Science, p. 131

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Reflex tester. In: Greene, Quick-N-Easy, pp. 15-17

Stimulating your reflexes. In: Challand, ...Life Sciences, pp. 76-77, 88

- REFRACTION

Inversion of written words by a tube of water. In: Hilton, Physics, p. 73

Invisible coin trick. In: McGill, Science, p. 125

Light and dark areas and rainbows created by light passing through a transparent hexagonal ball-point pen case. In: Zubrowski, Ball-Point Pens, pp. 40-43

Reflection and refraction. In: Kent, Introduction, pp. 10-11

Refraction of light; index of refraction of air (brief information). In: Hilton, Physics, pp. 70-72

Showing that light can be bent (refracted). In: Jacobson, Science, pp. 79-80

Two light refraction demonstrations. In: Arnov, Water, pp. 60-63

What is a fish's view of a fisherman and the fly he has cast on the water? Sci Am, Mar. '84, pp. 138-144

REFRIGERATION AND REFRIGERATING MACHINERY

Air conditioning and refrigerators. In: Cooper, How Everyday, pp. 24, 26

REFUSE AND REFUSE DISPOSAL

See also SEWAGE

Reverse garden -- experimenting with the natural degradability of various garbage items. In: Scienceworks, p. 26

REGENERATION (BIOLOGY)

Regenerating animals, with instructions regarding the planarian.
In: Challand, ...Life Sciences, pp. 50, 86

REPRODUCTION

Watching changes in chick embryos. In: Challand, ...Life Sciences, p. 57

REPTILES

Tree-dwelling mammals, reptiles, amphibians and insects, including suggestions for projects. In: Brown, Investigating, pp. 151-154

RESINS, ION-EXCHANGE

See ION-EXCHANGE RESINS

RESONANCE

Electrical resonance. In: Hilton, Physics, pp. 67-68
People listening to a bell can perceive sounds the bell does not really make -- investigating acoustic resonance. Sci Am, July '84, pp. 132-138
Resonance: mechanical resonance, vibrating strings, resonance with a laboratory burner, acoustical resonators, forced harmonic motion (brief information). In: Hilton, Physics, pp. 44-46

RESPIRATION

Breathing -- the lime water test. In: Walters, Chemistry, p. 9
How does exercise affect the breathing rate? In: Jacobson, Science, pp. 114
Measuring the effect of carbon dioxide in blood on breathing rate.
In: Challand, ...Life Sciences, p. 70
Testing chemicals in exhaled air - testing for carbon dioxide using bromothymol blue and also using limewater. In: Challand, ...Life Sciences, pp. 66, 87

RIVERS

Calculating the flow speed of streams and rivers. In: Challand, ...Earth Sciences, p. 26
Creating a delta. In: Challand, ...Earth Sciences, p. 34

ROBOTS

Robot lingo -- electronic device allowing you to create sound effects.
In: Greene, Quick-N-Easy, pp. 78-79

ROCKETS (AERONAUTICS)

How does a rocket work? In: Jacobson, Science, pp. 190-191
Experimenting with balloon rockets. In: Challand, ...Earth Sciences, pp. 56, 84

ROCKS

ROCKS

Classifying rocks. In: Challand, ...Earth Sciences, pp. 20-21, 88-89
 Rock porosity and scientific methodology. Sci Teach, Dec. '84, p. 49
 Weathering rocks. In: Challand, ...Earth Sciences, pp. 26-27, 82

ROOTS (BOTANY)

Testing the acidity of growing roots. In: Challand, ...Life Sciences, p. 37

ROPE

Laying a rope; natural plant cordage; fiber flame tests; making your own glue; etc. In: Cobb, Secret, pp. 31-45

ROTATIONAL MOTION

Circular motion - various demonstrations (brief information). In: Hilton, Physics, pp. 17-18
 Fabulous flywheel, from a button and thread. In: Scienceworks, p. 83
 Moment of inertia; rotation: gyroscopes, Foucault pendulums, precession, conservation of angular momentum, elasticity, free fall paradox, conical pendulum (brief information). In: Hilton, Physics, pp. 20-24

RUST

"Burning" steel -- experimenting with the rusting of steel wool.
 In: Cobb, Chemically Active, pp. 67-71
 How metals react; what makes things rust? Flame tests for metals.
 In: Chisholm, Introduction, pp. 26-27
 Rusting. In: Walters, Chemistry, p. 8

SALIVA

The effects of saliva on starch. Sci Teach, Jan. '85, p. 54

SALTS

Acids, bases and salts; testing acids and alkalis; neutralization reactions; etc. In: Chisholm, Introduction, pp. 28-29

SAND

"Dry sand" demonstration involving coating sand with paraffin and placing coated sand in water. In: McGill, Science, pp. 72-73
 Separating salt and sand. In: Jennings, Everyday Chemicals, p. 29

SATURN (PLANET)

Observations of Saturn. In: Sherrod, Complete Manual, pp. 180-191, 284

SCALES (WEIGHING INSTRUMENTS)

The analytical balance - two-pan balances, single-pan balances, weighing errors, general rules for balance use. In: Day, Quantitative, pp. 552-563
 An ancient find; On Balances; and cents into your science courses -- investigations of balance. Sci Teach, Oct. '84, pp. 32-35
 An equal-arm balance. In: Zubrowski, Ball-Point Pens, pp. 14-16
 How to make an equal-arm balance. In: Jacobson, Science, pp. 164-165

SCALES (WEIGHING INSTRUMENTS) (continued)

Making a weighing balance. In: Catherall, Levers, p. 5

What is gravity? Weighing things; gravity and movement; balancing tricks.
In: Wilkes, Simple, pp. 23-29

SCHIFF'S FUCHSIN TEST

Schiff's fuchsin test. In: Wilcox, Experimental, pp. 144-145

SCIENCE - METHODOLOGY

Designing animal behavior experiments. In: Challand, ...Life Sciences, pp. 52-53

Making rounds with Dr. Semmelweis - forming hypotheses as the pioneer scientists did. Sci Teach, Jan. '84, pp. 33-37

Recording laboratory data. In: Day, Quantitative, pp. 548-549

Rock porosity and scientific methodology. Sci Teach, Dec. '84, p. 49

Smith, How Fast Do Your Oysters Grow?

-this book is a guide to doing science projects. Among the topics discussed are the following:

"What is an 'investigative science project'?"

"Choosing a topic for your investigation";

"Planning your investigation";

"Choosing your equipment and test procedures";

"Recording your data";

"Graphing your data";

"Drawing your conclusions"; and

"Reporting your results".

SCIENCE PROJECTS

Brief suggestions for investigations in the areas of petroleum chemistry, water electrolysis, electroplating and recombinant DNA. In: Tocci, Chemistry, pp. 148-149

Brief suggestions for projects regarding acid rain. In: Tocci, Chemistry, pp. 162-163

Brief suggestions for science explorations in the areas of plant growth and chromatography. In: Tocci, Chemistry, pp. 180-181

Brief suggestions of topics for further investigation regarding water.
In: Tocci, Chemistry, pp. 13-14

Does your science fair do what it should? Time to re-evaluate approach to these familiar research competitions. Sci Teach, Nov. '84, pp. 24-26

Electronic project construction procedures and enclosures. In: Hawkins, Digital, pp. 54-59

Exploring swamp life in a muskrat nest blind, including suggestions for swamp projects. In: Brown, Investigating, pp. 215-219

A few suggestions for the investigation of bats. Also diagram of a bat skeleton. Sci Teach, May '85, pp. 36-37, and letter of correction, Oct. '85, p. 54

How to create problems - coming up with a suitable research topic is tough; make it easier with this reliable approach. Sci Teach, Nov. '84, pp. 28, 30-31

List of some of the student projects winning awards in Westinghouse Talent Search (13 projects listed). Sci Teach, May '85, pp. 31-32

Meet me at the fair -- science fairs should be more like county fairs.
Sci Teach, Nov. '84, pp. 32-35

SCIENCE PROJECTS

SCIENCE PROJECTS (continued)

National Science Teachers Association, Science Fairs and Projects.

-many articles of use in planning, exhibiting and reporting science projects. Use of scientific principles is encouraged. Articles collected from the two magazines Science and Children and Science Teacher of the period 1966-1984

Pointing the way for young researchers. Sci Teach, Nov. '84, p. 35

Ponds, streams and freshwater aquariums, including projects for a pond and a freshwater aquarium; maintaining an aquarium; projects in running waters of streams. In: Brown, Investigating, pp. 173-186

Science is all around you; being a scientist. In: Wilkes, Simple, pp. 4-5

Scientific projects with birds. In: Brown, Investigating, pp. 46-47

Smith, How Fast Do Your Oysters Grow?

-this book is a guide to doing science projects. Among the topics discussed are the following:

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"Choosing your equipment and test procedures";

"Recording your data";

"Graphing your data";

"Drawing your conclusions"; and

"Reporting your results"

Science experiments with desert creatures -- investigations to be considered particularly by students living in the southwestern United States. In: Brown, Investigating, pp. 203-213

Studying of burrowing animals, including suggestions for projects to study such animals (beetles, ants, mice, moles, etc.). In: Brown, Investigating, pp. 165-171

Stwertka, Make It Graphic!

-types of graphs, suggested problems, misrepresentation of information with graphs, generating graphs with computers, etc. Suggested for grades five to nine

Topics and questions for investigation in chemistry -- ascorbic acid, caffeine, milk, colloids, artificial sweeteners and crystallization. In: Tocci, Chemistry, pp. 30-31

Tree-dwelling mammals, reptiles, amphibians and insects, including suggestions for projects. In: Brown, Investigating, pp. 151-154

Wold, Computer Science: Projects for Young Scientists.

-how to use microcomputers to prepare and present science projects

SCIENTIFIC APPARATUS AND INSTRUMENTS

NSTA Directory of Science Education Suppliers -- includes suppliers of laboratory equipment. Sci Teach, Jan. '84, unnumbered pages following p. 72

SCREWS

Screws. In: Cooper, How Everyday, p. 18

Screws, including making a model screw pump. In: Catherall, Levers, pp. 28-32

Tools: simple machines -- hammers as levers; nails, tacks, chisels and other wedges; screws; etc. In: Cobb, Secret, pp. 46-65

SEASONS

- Explaining the seasons using a globe and flashlight. In: Challand, ...Earth Sciences, pp. 46-47, 84
- Winter, summer: exactly where is the sun -- demonstrating seasonal changes using a clay ball and a flashlight. In: Adams, Catch, pp. 29-34
- Winter, summer: where is the sun? In: Adams, Catch, pp. 16-18

SEAWEED

- Tide pools and saltwater aquariums; equipment for exploring a tide pool, collecting and mounting seaweeds, photographing animals in tide pools; and experiments with seashore animals. In: Brown, Investigating, pp. 187-201

SECCHI DISK

- See WATER - ANALYSIS

SEDIMENTATION AND DEPOSITION

- Creating a delta. In: Challand, ...Earth Sciences, p. 34

SEEDS

- Calculating the rate of seed germination. In: Challand, ...Life Sciences, p. 20
- Discovering how plants, including seeds, react - thigmotropism, phototropism, hydrotropism, chemotropism, geotropism. In: Challand, ...Life Sciences, pp. 32-33, 85
- Growing tree seeds. In: Challand, ...Life Sciences, p. 21
- Investigation of what is inside a seed. In: Jacobson, Science, pp. 6-7
- Seed sense - demonstrating that plants can determine which way to send roots and stems. In: Scienceworks, p. 21
- Seeds: annuals and perennials, buying seeds, growing bedding plants from seed, planting seeds, transplanting, stratification of seeds, dormancy, pollination, experiments with seeds, etc. In: Hill, Secrets, pp. 26-51
- Showing the strength of growing seeds. In: Challand, ...Life Sciences, p. 24
- Specifics of propagation: fruits & nuts; trees, shrubs, and vines; herbaceous plants. In: Hill, Secrets, pp. 119-156
- Testing the effect of heat and light on germination. In: Challand, ...Life Sciences, pp. 36, 85

SEISMOMETERS

- Recording vibrations in the earth. In: Challand, ...Earth Sciences, p. 36

SEPARATION (TECHNOLOGY)

- Extraction with solvents -- extraction of solids, solutions, multiple extractions, laboratory practice and representative extractions. In: Wilcox, Experimental, pp. 79-91
- Separating salt and sand. In: Jennings, Everyday Chemicals, p. 29
- Separating things - by evaporation, use of magnets, distillation, chromatography. In: Chisholm, Introduction, pp. 10-11

SEWAGE

- Sewage works, including diagrams. In: Cooper, How Everyday, pp. 22-23

SHADES AND SHADOWS

SHADES AND SHADOWS

See SHADOWS

SHADOWS

How do the shadows change during the day? In: Jacobson, Science, pp. 184-185

Shadow theater: why things have shadows, shadow puzzle, making a shadow clock, etc. In: Wilkes, Simple, pp. 20-21

The sun and shadows - investigating shadows cast by the sun. In: Adams, Catch, pp. 13-16

SHAMPOO

How good is your shampoo? -- investigating pH, foam formation, dispersion ability, viscosity. In: Tocci, Chemistry, pp. 96-98

SHRIMPS

Raising brine shrimp. In: Challand, ...Life Sciences, p. 54

SILICATES

Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63

SILK

Raising your own silk. In: Challand, ...Life Sciences, p. 52

SILKWORMS

Raising your own silk. In: Challand, ...Life Sciences, p. 52

SILVER

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange -- 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Determination of silver in an alloy. In: Day, Quantitative, p. 577

Electrical silver polish using aluminum foil and baking soda. In: Cobb, Chemically Active, pp. 95-96

Very brief discussion of some aspects of radioactivity and associated apparatus - van de Graaff machine, half-life of silver, etc. In: Hilton, Physics, pp. 101-102

SILVER NITRATE

Preparation of 0.1M solutions of silver nitrate and potassium thiocyanate. In: Day, Quantitative, pp. 573-574

Standardization of silver nitrate and potassium thiocyanate solutions (Mohr and Fajans methods). In: Day, Quantitative, pp. 574-575

SIMPLE MACHINES

See also specific simple machines such as INCLINED PLANES

Simple machines, including levers and pulleys. In: Wilkes, Simple, pp. 32-33

SIMPLE MACHINES (continued)

Tools: simple machines -- hammers as levers; nails, tacks, chisels and other wedges; screws; etc. In: Cobb, Secret, pp. 46-65

What are some simple machines and some of the advantages of using simple machines? In: Jacobson, Science, p. 172

SIPHONS

Energy-saving aquarium drainer. In: Scienceworks, p. 56

Various simple investigations with water, including making a simple siphon. In: Wilkes, Simple, pp. 14-15

SIRENS

Continental siren. In: Greene, Quick-N-Easy, pp. 73-75

Siren soundoff. In: Greene, Quick-N-Easy, pp. 22-23

A whooper siren. In: Traister, Third, pp. 17-18

SKIN

Charting nerve endings in the skin. In: Challand, ...Life Sciences, p. 78

Checking the temperature receptors in skin using containers with water of different temperatures. In: Challand, ...Life Sciences, p. 79

Cleaning your skin - demonstration using water, soap, oil and soil. In: Challand, ...Life Sciences, p. 80

Discovering some functions of the skin. In: Challand, ...Life Sciences, pp. 61, 86

Hot or cold trick -- can water be hot and cold at the same time? In: Scienceworks, p. 63

SMELL

Can objects be identified by their odor? In: Jacobson, Science, pp. 104-105

How the senses of taste and smell are interrelated. In: Jacobson, Science, p. 106

Taste test -- demonstration of the importance of odour. In: Scienceworks, p. 62

SMOKE

Relevance is primary in secondary chemistry: chemistry experiments on cigarette smoke and on alcohol. Sci Teach, Dec. '85, pp. 32-35

SNAILS

Finding out how snails behave. In: Challand, ...Life Sciences, p. 51

SNAKES

The care of snakes. In: Smith, Snakes, pp. 39-73

Habits of snakes. In: Smith, Snakes, pp. 74-77

Identification of the main groups of non-poisonous snakes in the United States. In: Smith, Snakes, pp. 22-28

Obtaining the snake. In: Smith, Snakes, pp. 34-38

Selecting your pet snake. In: Smith, Snakes, pp. 99-146

Snakes - catching snakes, keeping snakes in captivity, behavior of different snakes, suggested projects. In: Brown, Investigating, pp. 57-63

SNAKES

SNAKES (continued)

- Snakes - diseases and parasites. In: Smith, Snakes, pp. 85-87
- Snakes - reproduction and breeding. In: Smith, Snakes, pp. 78-84
- Snakes - taming and training. In: Smith, Snakes, pp. 88-98
- Snakes as pets. In: Smith, Snakes, pp. 5-21
- Techniques of snake handling. In: Smith, Snakes, pp. 29-33

SNOW

- Measuring snowfall. In: Challand, ...Earth Sciences, p. 63

SOAP

See also SHAMPOO

- Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange -- 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15
- Experiments with and information about soaps and detergents. In: Tocci, Chemistry, pp. 107-116, 119-120
- Moving match sticks: soap and sugar affect water's surface tension in different ways. In: Watson, Liquid, p. 31
- Soap film experiments. In: Scienceworks, p. 85
- Surface tension and soap films -- some simple demonstration items (brief information). In: Hilton, Physics, pp. 25-26
- Tricky soap using some aniline dye. In: McGill, Science, pp. 66-67

SOAP BUBBLES

- Soap bubble spectra: easily constructed 'Rainbow Cup' -- dramatic demonstration of laws of optics in a soap bubble. Sci Teach, Jan. '84, pp. 26-27, and correction Mar. '84, p. 80
- Three unusual bubble experiments. In: Scienceworks, pp. 84-85

SODIUM

- Burning water -- sodium "burns" in water. In: Walters, Chemistry, p. 24

- SODIUM BICARBONATE

- Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange - 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15
- Electrical silver polish using aluminum foil and baking soda. In: Cobb, Chemically Active, pp. 95-96
- White-powder chemistry: distinguishing among some common kitchen powders - starch, flour, sugar, salt and baking soda - using some elementary observational methods. In: Gardner, Kitchen, pp. 115-119

SODIUM CARBONATE

Chemical reactions involving 1)loss; 2)gain; 3)replacement; and 4)exchange - 1)reactions involving baking soda and hydrogen peroxide; 2)reaction of silver and sulfur; 3)replacement of copper by iron and Thermit process; and 4)exchange of sodium and calcium in soap/hard water reaction, and formation of chrome yellow. In: Walters, Chemistry, pp. 12-15

Determination of the alkalinity of soda ash (crude sodium carbonate).

In: Day, Quantitative, pp. 570-571

Standardization of hydrochloric acid solution with sodium carbonate.

In: Day, Quantitative, pp. 568-569

SODIUM CHLORIDE

Burning denatured alcohol containing sodium chloride in a dark room will produce an eerie ghost-like appearance on people's faces.

In: McGill, Science, p. 69

Making chlorine by electrolysis of concentrated solution of sodium chloride; hydrogen also produced. In: Walters, Chemistry, p. 29

Separating salt and sand. In: Jennings, Everyday Chemicals, p. 29

White-powder chemistry: distinguishing among some common kitchen powders - starch, flour, sugar, salt and baking soda - using some elementary observational methods. In: Gardner, Kitchen, pp. 115-119

SODIUM HYDROXIDE

Determination of the relative concentrations of hydrochloric acid and sodium hydroxide solutions. In: Day, Quantitative, pp. 566-567

Foaming colors: chemical color change demonstration using sodium hydroxide solution, Universal Indicator and dry ice. Sci Teach, Jan. '84, p. 64

Is it wine or is it water? -- demonstration using phenolphthalein solution, sodium hydroxide solution and sulphuric acid. In: McGill, Science, pp. 56-57

Preparation of 0.1N solutions of hydrochloric acid and sodium hydroxide.

In: Day, Quantitative, pp. 564-565

Standardization of sodium hydroxide solution with potassium acid phthalate.

In: Day, Quantitative, p. 567

SODIUM SILICATE

Magic flower seeds - growing a chemical "flower garden" from "magic flower seeds" made from a mixture of chemicals. In: McGill, Science, pp. 62-63

SODIUM SULPHOCYANATE

Magic wound -- iron chloride and sodium sulphocyanate solution will react to give a red, blood-like color. In: McGill, Science, pp. 68-69

The red hand - wet hand placed on paper containing some sodium sulphocyanate (caution indicated in instructions) will turn red.

In: McGill, Science, pp. 70-71

SODIUM THIOSULPHATE

"Capturing smoke in a glass of water" -- demonstration using sulphuric acid and a sodium thiosulphate solution. In: McGill, Science, p. 58

Crystallization, including procedures for making rock candy sugar crystals, crystals on glass and crystals using sodium thiosulfate. Suggestions

SODIUM THIOSULPHATE

SODIUM THIOSULPHATE (continued)

for other crystals to grow. In: Cobb, Chemically Active, pp. 29-41
 Preparation and standardization of a 0.1N sodium thiosulfate solution.
 In: Day, Quantitative, pp. 598-600

SOIL MICRO-ORGANISMS

Determining factors necessary for humus breakdown. In: Challand,
 ...Earth Sciences, p. 15

SOIL MOISTURE

Determining water retention of soils. In: Challand, ...Earth Sciences,
 pp. 14, 81
 How does water move up and down in soil? In: Jacobson, Science, pp. 130-131
 How much water can different kinds of soil hold? In: Jacobson, Science,
 pp. 128-129
 Measuring the porosity of soils. In: Challand, ...Earth Sciences, pp. 18, 82
 Soil moisture monitor. In: Greene, Easy, pp. 24-25

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Classifying soils by touch. In: Challand, ...Earth Sciences, p. 10
 Collecting soils; extracting the soil horizons. In: Challand,
 ...Earth Sciences, pp. 12-13
 Conserving topsoil -- an erosion demonstration. In: Challand,
 ...Earth Sciences, pp. 13, 81
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 Determining how much soil plants use. In: Challand, ...Life Sciences,
 pp. 25, 84
 Experimenting with the storage of heat by water and soil. In: Arnov,
 Water, pp. 38-41
 How do sediments settle under water? In: Jacobson, Science, pp. 124-125
 Making soil. In: Challand, ...Earth Sciences, pp. 9, 81
 Soil profile: what kind of soil do we have underground? In: Jacobson,
 Science, pp. 126-127
 Sorting soils with sieves. In: Challand, ...Earth Sciences, p. 11
 Various investigations of soil - how much loam it has, what its pH
 is, how wet it is, how much humus it contains. In: Tocci, Chemistry,
 pp. 164-172
 What is our soil like? In: Jacobson, Science, p. 121

SOILS - ANALYSIS

Measuring the porosity of soils. In: Challand, ...Earth Sciences,
 pp. 18, 82
 Mineral salts in the soil. In: Jennings, Everyday Chemicals, pp. 23-24
 Setting up a Berlese funnel. In: Challand, ...Earth Sciences, p. 30
 Various investigations of soil -- how much loam it has, what its pH
 is, how wet it is, how much humus it contains. In: Tocci, Chemistry,
 pp. 164-172

SOLAR BATTERIES

Solar cells - performing "optical listening." In: Graf, Exploring,
 pp. 115-151

SOLAR CELLS

See SOLAR BATTERIES

SOLAR COOKERY

- Chicken cooker. In: Barling, John Barling's Solar, pp. 31-35
- Parabolic concentrating cooker. In: Barling, John Barling's Solar, pp. 37-40
- Solar cooker. In: Scienceworks, pp. 28-29
- Solar cooking devices: hot dog cooker. In: Barling, John Barling's Solar, pp. 15-20
- Solar cooking devices: super hot dog cooker. In: Barling, John Barling's Solar, pp. 21-23
- Solar oven. In: Barling, John Barling's Solar, pp. 25-30
- Using the sun to cook your food. In: Adams, Catch, pp. 62-68

SOLAR ENERGY

- Collecting the sun's energy. In: U.S. Department of Energy, Solar... Junior High, pp. 2-1 to 2-10
- Detecting solar energy. In: U.S. Department of Energy, Solar...Earth Science, pp. 19-1 to 19-5
- Energy from the sun -- what are some factors affecting placement of a solar collector. In: U.S. Department of Energy, Solar...Junior High, pp. 3-1 to 3-6
- Energy storage - comparing ability of air and rock to capture and store heat energy. In: U.S. Department of Energy, Solar...Junior High, pp. 4-1 to 4-6
- Exploring basic properties of solar energy: absorption. In: U.S. Department of Energy, Solar...Junior High, pp. 5-1 to 5-7
- Exploring basic properties of solar energy: reflection. In: U.S. Department of Energy, Solar...Junior High, pp. 6-1 to 6-8
- Exploring basic properties of solar energy: transmission. In: U.S. Department of Energy, Solar...Junior High, pp. 7-1 to 7-9
- Exploring solar energy: experiment with a solar still and general information on the sun and uses of solar energy. In: Science Activities, pp. 25-28
- How can a simple solar collector be constructed? In: Jacobson, Science, pp. 91-92
- Let's put solar energy to work -- experiment to try to collect solar energy and to examine its effects on water, chocolate bars and tea bags in water. In: U.S. Department of Energy, Solar...Junior High, pp. 10-1 to 10-9
- Sun energy can separate salt water into fresh water and salt -- making a solar still. In: Adams, Catch, pp. 36-38
- Solar energy collection techniques; collector efficiency; systems for heating and cooling; determining collector area and storage capacity, etc. In: AMETEK, Solar Energy, pp. 72-144
- Solar energy -- how well does it work? In: U.S. Department of Energy, Solar...Earth Science, pp. 20-1 to 20-10
- Solar energy in a coffee can - constructing a simple solar collector. In: U.S. Department of Energy, Solar...Junior High, pp. 12-1 to 12-8
- Solar power supply. In: Traister, 32 Electronic, pp. 216-228
- What is solar energy -- activity to learn about some of the characteristics of radiant energy. In: U.S. Department of Energy, Solar...Earth Science, pp. 25-1 to 25-7

SOLAR FURNACES

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- Building a solar still. In: U.S. Department of Energy, Solar...Earth Science, pp. 17-1 to 17-7
- Chicken cooker. In: Barling, John Barling's Solar, pp. 31-35
- Cloud covering and its effect on available incident solar radiation. In: U.S. Department of Energy, Solar...Earth Science, pp. 18-1 to 18-7
- Collecting the sun's energy. In: U.S. Department of Energy, Solar... Junior High, pp. 2-1 to 2-10
- Color and the sun's rays -- how long does it take various colors of paper to burn. In: Adams, Catch, pp. 41-42
- Constructing a solar furnace. In: Adams, Catch, pp. 45-59
- A cup of sunlight -- effects of heat on various surfaces. In: U.S. Department of Energy, Solar...Earth Science, pp. 15-1 to 15-9
- Effect of surface color on heat absorption. In: U.S. Department of Energy, Solar...Junior High, pp. 14-1 to 14-8
- Energy from the sun -- what are some factors affecting placement of a solar collector. In: U.S. Department of Energy, Solar...Junior High, pp. 3-1 to 3-6
- Exploring solar energy: experiment with a solar still and general information on the sun and uses of solar energy. In: Science Activities, pp. 25-28
- Food dryer using solar energy. In: Barling, John Barling's Solar, pp. 84-87
- Fresnel lens concentrator. In: Barling, John Barling's Solar, pp. 98-100
- Giant experimental reflector. In: Barling, John Barling's Solar, pp. 101-105
- Glass solar still. In: Barling, John Barling's Solar, pp. 110-113
- "Greenhouse effect" of earth's atmosphere. In: U.S. Department of Energy, Solar...Earth Science, pp. 22-1 to 22-8
- The heating and cooling of objects by radiation. In: U.S. Department of Energy, Solar...Junior High, pp. 8-1 to 8-10
- How can a simple solar collector be constructed? In: Jacobson, Science, pp. 91-92
- Let's put solar energy to work -- experiment to try to collect solar energy and to examine its effects on water, chocolate bars and tea bags in water. In: U.S. Department of Energy, Solar...Junior High, pp. 10-1 to 10-9
- Low-cost air heater. In: Barling, John Barling's Solar, pp. 69-72
- Model solar greenhouse. In: Barling, John Barling's Solar, pp. 79-82
- Parabolic concentrating cooker. In: Barling, John Barling's Solar, pp. 37-40
- Roof overhang -- using a model house to demonstrate how roof overhang affects solar heating of a home. In: U.S. Department of Energy, Solar...Junior High, pp. 11-1 to 11-6
- Solar cold frame. In: Barling, John Barling's Solar, pp. 75-78
- Solar cooking devices: hot dog cooker. In: Barling, John Barling's Solar, pp. 15-20
- Solar cooking devices: super hot dog cooker. In: Barling, John Barling's Solar, pp. 21-23
- Solar desalinizer. In: U.S. Department of Energy, Solar...Junior High, pp. 1-1 to 1-8

SOLAR HEATING (continued)

- Solar energy collection techniques; collector efficiency; systems for heating and cooling; determining collector area and storage capacity, etc. In: AMETEK, Solar Energy, pp. 72-144
- Solar energy in a coffee can -- constructing a simple solar collector. In: U.S. Department of Energy, Solar...Junior High, pp. 12-1 to 12-8
- Solar oven. In: Barling, John Barling's Solar, pp. 25-30
- Solar water cleaner. In: Scienceworks, p. 25
- Solar wood igniter. In: Barling, John Barling's Solar, pp. 116-118
- Sun energy can burn paper. In: Adams, Catch, pp. 39-40
- Sun energy can melt ice - experiment with two ice cubes. In: Adams, Catch, pp. 35-36
- Sun, water, black, and glass -- how does covering the pan of water with a sheet of glass affect the heating of the water. In: Adams, Catch, pp. 44-45
- Sun, water, black, white -- does water in the black or the white pan get hotter? In: Adams, Catch, pp. 42-44
- Sun's position in the sky -- collecting data on sun's position at various times to provide useful information in solar energy designs. In: U.S. Department of Energy, Solar...Earth Science, pp. 23-1 to 23-10
- Weather wear -- experimenting with temperatures of water in dark and light cups sitting in the sun. In: Scienceworks, p. 24

SOLAR RADIATION

- Cloud covering and its effect on available incident solar radiation. In: U.S. Department of Energy, Solar...Earth Science, pp. 18-1 to 18-7
- Earth's energy budget -- model of pattern of insolation for northern mid-latitudes over a period of time. In: U.S. Department of Energy, Solar...Earth Science, pp. 21-1 to 21-8
- "Greenhouse effect" of earth's atmosphere. In: U.S. Department of Energy, Solar...Earth Science, pp. 22-1 to 22-8
- Sun's rays bring heat and light -- experiments with atmospheric temperature and with angles of incidence of light rays. In: Adams, Catch, pp. 19-21
- Temperature differences on a hill. In: Jacobson, Science, pp. 95-96
- Variation of the sun's intensity in relationship to its position in the sky. In: U.S. Department of Energy, Solar...Earth Science, pp. 24-1 to 24-8

SOLAR WATER HEATERS

- Barling's barrel bread-box heater -- can be a low-technology solar water heater. In: Barling, John Barling's Solar, pp. 51-54
- Demonstration hot water heater. In: Barling, John Barling's Solar, pp. 48-50
- Experimental concentrating water heater. In: Barling, John Barling's Solar, pp. 92-95
- Solar swimming pool heater. In: Barling, John Barling's Solar, pp. 55-67
- A solar water heater. In: U.S. Department of Energy, Solar...Junior High, pp. 13-1 to 13-7
- Water preheating panel. In: Barling, John Barling's Solar, pp. 43-46

SOLDER AND SOLDERING

- Building printed circuits, including soldering instructions. In: Hawkins, Digital, pp. 9-53

SOLENOIDS

SOLENOIDS

Construction details of solenoid type of electromagnet. In: Math, Wires, p. 51

SOLIDS

Changing two liquids to a solid using calcium chloride and potassium carbonate. In: McGill, Science, p. 66

Solids, liquids and gases -- three states of matter. In: Chisholm, Introduction, pp. 8-9

SOLIDS - DENSITY

Archimedes' Principle -- water's buoyant force used to determine metal cylinder's density (brief information). In: Hilton, Physics, p. 25

Pieces of equipment useful in demonstrating density matters (brief information). In: Hilton, Physics, p. 24

SOLIDS, EXPANSION OF

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SOLUBILITY

Crystals in hot and cold water. In: Gardner, Kitchen, pp. 67-68

Disappearing and non-disappearing solids -- various experiments with solutions and solubility. In: Gardner, Kitchen, pp. 26-31

Solubility classification and testing. In: Wilcox, Experimental, pp. 133-138

SOLUTION (CHEMISTRY)

Colored liquids that sink or float -- experiment with salt solutions of various concentrations. In: Gardner, Kitchen, pp. 99-104

Disappearing and non-disappearing solids -- various experiments with solutions and solubility. In: Gardner, Kitchen, pp. 26-31

Do gases dissolve in liquids? Or in other gases? In: Gardner, Kitchen, pp. 32-33

From colloid to solution in one easy step -- suggestion for an experiment. In: Tocci, Chemistry, pp. 23-24

Preparing iron sulfate solution, and a general discussion of solutions. In: Cobb, Chemically Active, pp. 18-25

SOLUTIONS, SUPERSATURATED

A supersaturated solution. In: Gardner, Kitchen, pp. 68-69

SOLVENTS

Extraction with solvents -- extraction of solids, solutions, multiple extractions, laboratory practice and representative extractions. In: Wilcox, Experimental, pp. 79-91

SOUND

Ardley, Sound and Music.

-short book, with experiments, on topics such as producing, hearing, amplifying and transmitting sound, sound speed, pitch, and musical instruments (including the sounds of various instruments)

Beats; Doppler effect; musical acoustics (brief information). In: Hilton, Physics, pp. 46-48

SOUND (continued)

- Calculating the speed of sound and lightning -- method of calculating the distance of a thunderstorm. In: Challand, ...Earth Sciences, p. 77
- Diffraction and interference -- single and multiple slits, interference in thin films, Pohl's experiment, Newton's Rings, Arago's White Spot, acoustical interference, etc. In: Hilton, Physics, pp. 78-83
- Exploring sound with a simple homemade oscilloscope; also general information about sound - method of travel, speed, Doppler effect and more. In: Science Activities, pp. 37-40
- Grass music -- electronic project involving pumping music into the ends of your lawn and picking the sounds up again at other places. In: Greene, Easy, pp. 66-67
- Gravity and the speed of sound. Sci Teach, Dec. '85, p. 48
- Group of acoustic demonstrations, including "visible sound vibrations," "musical bottle," "musical glass," tuning a guitar without using your ears, sound magnification with a balloon, and making an Aeolian harp and the "magical humming glass." In: McGill, Science, pp. 92-99
- How can we locate the direction of sounds we hear? In: Jacobson, Science, pp. 101-102
- Light-sensitive audio oscillator: the Sonalight -- changes light intensity into sound. In: Graf, One, pp. 66-78
- Seeing sound and hearing through your teeth. In: Scienceworks, pp. 64-65
- Sound: bell in a vacuum, Savart's wheels, intensity of sound, manometric capsule, velocity of sound (brief information). In: Hilton, Physics, pp. 42-43
- Sounds like fun -- demonstration of "sounds on the move". In: Scienceworks, p. 51
- What happens when you make a sound? Decibel levels of various sounds. In: Kent, Introduction, pp. 18-19
- Why do things make sounds? Vibrations; how sound travels (making a simple string telephone); high sounds and low sounds. In: Wilkes, Simple, pp. 26-27

SOUND - APPARATUS

- Sound combiner -- mix four audio sources into one. In: Greene, Easy, p. 84

SOUND - RECORDING AND REPRODUCING

- Record player -- making a record, playing a record, digital recording, compact discs (very general elementary discussion). In: Cooper, How Everyday, pp. 45-47

SOUND - TRANSMISSION

- Ardley, Sound and Music.
 - short book, with experiments, on topics such as producing, hearing, amplifying and transmitting sound, sound speed, pitch, and musical instruments (including the sounds of various instruments)
- Sound over a light beam. In: Graf, One, pp. 111-121
- Talking on a light beam. In: Math, Morse, pp. 36-49

SOUND EFFECTS

SOUND EFFECTS

- Phaser sound effect. In: Greene, Quick-N-Easy, pp. 32-33
- Robot lingo -- electronic device allowing you to create sound effects. In: Greene, Quick-N-Easy, pp. 78-79
- Sound effects. In: Cobb, How to, pp. 35-38

SOUND WAVES

- Seeing sound and hearing through your teeth. In: Scienceworks, pp. 64-65
- Sounds like fun -- demonstration of "sounds on the move". In: Scienceworks, p. 51

SPECIFIC HEAT

See HEAT

SPECTROMETER

- Spectra (brief information), and short article on using the Barnes ES-100 educational spectrometer. In: Hilton, Physics, pp. 85-87

SPECTROMETRY

See e.g., INFRARED SPECTROMETRY and SPECTROPHOTOMETRY; headings beginning with SPECTRO

SPECTROPHOTOMETRY

See also e.g., INFRARED SPECTROMETRY; NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY; headings beginning with SPECTRO

- Determination of iron with 1,10-phenanthroline spectrophotometrically. In: Day, Quantitative, pp. 605-606
- Determination of manganese in steel spectrophotometrically. In: Day, Quantitative, pp. 603-605
- Spectrophotometric determination of iron in vitamin tablets. In: Harris, Quantitative, pp. 631-633
- Spectrophotometric determination of nitrite in water. In: Day, Quantitative, pp. 606-608
- Spectrophotometric determination of the pK_a of an acid-base indicator. In: Day, Quantitative, pp. 608-611
- Spectrophotometric measurement of an equilibrium constant. In: Harris, Quantitative, pp. 633-634

SPECTROSCOPE

- Assembling a spectroscope. In: Challand, ...Earth Sciences, p. 52

SPECTROSCOPY

See e.g., various headings beginning with SPECTRO; SPECTRUM (LIGHT) AND SPECTRUM ANALYSIS; NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; VISIBLE SPECTROSCOPY; INFRARED SPECTROMETRY

SPECTRUM (LIGHT) AND SPECTRUM ANALYSIS

- Colored light - making rainbows; disappearing colors -- blending colors with a spinning color wheel; making colored viewers. In: Wilkes, Simple, pp. 24-25
- The continuous spectrum of the sun -- deriving some of the sun's properties by means of solar spectrum analysis (data given). In: Culver, Introduction, pp. 74-79

SPECTRUM (LIGHT) AND SPECTRUM ANALYSIS (continued)

- Investigating the space motion of Barnard's star (data given). In: Culver, Introduction, pp. 80-86
- Make a spectrum. In: Kent, Introduction, p. 12
- Making a rainbow -- of what colors is white light composed? In: Jacobson, Science, pp. 84-85
- Method of spectroscopic parallax -- using given spectra to determine distance and parallax of a star. In: Culver, Introduction, pp. 94-100
- Separating sunshine with a mirror and water. In: Challand, ...Earth Sciences, p. 43
- Soap bubble spectra: easily constructed 'Rainbow Cup' -- dramatic demonstration of laws of optics in a soap bubble. Sci Teach, Jan. '84, pp. 26-27, and correction Mar. '84, p. 80
- Some physical properties of stars (temperature, luminosity, radius) through spectrum analysis (data given). In: Culver, Introduction, pp. 87-93
- Spectra (brief information), and short article on using the Barnes ES-100 educational spectrometer. In: Hilton, Physics, pp. 85-87
- Spectra of streetlights illuminate basic principles of quantum mechanics. Sci Am, Jan. '84, pp. 138-142, 142B-143, 146

SPEECH

- An illusion worth repeating -- "verbal alternation." In: Cobb, How to, p. 42

SPEED

- Measurement of constant velocity (brief information). In: Hilton, Physics, p. 2
- On the rebound -- using a bouncing ball to investigate impact velocity, etc. Sci Teach, Jan. '84, p. 64

SPIDER WEBS

- Wonderful spiders and their webs, including descriptions of different webs and the photographing of webs. In: Brown, Investigating, pp. 123-137

SPIDERS

- Investigating jumping spiders. In: Brown, Investigating, pp. 119-122

SPINNERS (AERONAUTICS)

- See AIRPLANES

SPORES (BOTANY)

- Making spore prints of mushrooms. In: Challand, ...Life Sciences, p. 13

STALACTITES

- See CRYSTALS AND CRYSTALLIZATION

STALAGMITES

- See CRYSTALS AND CRYSTALLIZATION

STARCH

STARCH

- Determining the role of chlorophyll. In: Challand, ...Life Sciences, pp. 24-25, 84
- The effects of saliva on starch. Sci Teach, Jan. '85, p. 54
- Iodine and water/flour solution demonstration. In: Arnov, Water, pp. 23-24
- Iodine to ink -- a test for starch. In: Gardner, Kitchen, pp. 81-82
- Test for starch. In: Cobb, Chemically Active, p. 131
- Testing for carbohydrates. In: Challand, ...Life Sciences, p. 62
- Testing for starch using iodine solution, and some background information on starches. In: Tocci, Chemistry, p. 46
- Testing for vitamin C using starch and iodine solutions. In: Tocci, Chemistry, pp. 24-27
- Watch an enzyme at work -- iodine test on starch solution and on starch and saliva mixture. In: Chisholm, Introduction, p. 25
- White-powder chemistry: distinguishing among some common kitchen powders - starch, flour, sugar, salt and baking soda - using some elementary observational methods. In: Gardner, Kitchen, pp. 115-119

STARS

- The color-magnitude diagram for the Hyades (data given). In: Culver, Introduction, pp. 101-109
- The Crab Nebula pulsar - investigation of some of its properties (data given). In: Culver, Introduction, pp. 160-166
- The distance and absolute magnitude of a galactic nova (data given). In: Culver, Introduction, pp. 110-117
- Gravitational bending of starlight (data given). In: Culver, Introduction, pp. 154-159
- An inexpensive star chart. Sci Teach, Dec. '85, p. 47
- "Investigating starlight" by observing Bunsen burner flames as they are adjusted and by observing the heating of wire. In: Challand, ...Earth Sciences, p. 50
- Investigating the space motion of Barnard's star (data given). In: Culver, Introduction, pp. 80-86
- Lunar occultations. In: Sherrod, Complete Manual, pp. 121-139, 281
- Making a star map. In: Challand, ...Earth Sciences, p. 48
- Method of spectroscopic parallax -- using given spectra to determine distance and parallax of a star. In: Culver, Introduction, pp. 94-100
- Photometric astronomy -- determination of the magnitude of a star by photographic methods (data given). In: Culver, Introduction, pp. 16-22
- Selection of appropriate star atlases. In: Sherrod, Complete Manual, pp. 19-20, 22
- Some physical properties of stars (temperature, luminosity, radius) through spectrum analysis (data given). In: Culver, Introduction, pp. 87-93
- Star charts showing the constellations and major stars. In: Traister, Astronomy, pp. 183-189
- Star light, star bright -- calculate how bright a twinkle each star has using this easy method. Sci Teach, Sept. '84, pp. 51-53
- Starcharts. In: Mayer, Starwatch, pp. 21-117
- Starframes from coathangers and plastic kitchen wrap. And star photos which can be used to paint stars on the starframes. In: Mayer, Starwatch, pp. 16-17, 21-117
- Studies of variable stars, including searching for novae and supernovae.

STARS (continued)

- In: Sherrod, Complete Manual, pp. 202-223, 286
 Taking pictures of star trails. In: Challand, ...Earth Sciences, pp. 50-51, 84
 Variable stars. In: Mayer, Starwatch, pp. 121-122
 The Wolf diagram for the Horsehead Nebula (data given). In: Culver, Introduction, pp. 118-124

STATICS (PHYSICS)

- Static equilibrium: pulleys add a new direction to experiments that demonstrate forces. Sci Teach, Dec. '85, pp. 20-23
 Statics and the walkways collapse. Sci Teach, Oct. '84, p. 59

STEAM

- Water from air; what is steam? where does rain come from? -- various demonstrations and discussions of water condensation. In: Wilkes, Simple, pp. 12-13

STEEL

- "Burning" steel -- experimenting with the rusting of steel wool.
 In: Cobb, Chemically Active, pp. 67-71
 Determination of manganese in steel spectrophotometrically. In: Day, Quantitative, pp. 603-605
 Determination of nickel in steel. In: Day, Quantitative, pp. 584-585
 Heating a wire tells a lot about changes in the crystal structure of steel. Sci Am, May '84, pp. 148, 150-154

STEREOPHONIC SOUND SYSTEMS

- Music stopper -- making stereo's manual turntable into an automatic shut-off system. In: Greene, Quick-N-Easy, pp. 50-51

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- In the balance: a stoichiometric experiment that works, using copper(I) iodide. Sci Teach, May '84, pp. 56-57

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- Searching for patterns of rainfall in a storm. Sci Am, Jan. '85, pp. 112-113, 116-120

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- Hydraulic ram, and hydraulic press (Welch) to measure breaking force or compressional force (brief information). In: Hilton, Physics, p. 25
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- Cat's cradle and other topologies formed with a two-meter loop of flexible string. Sci Am, May '85, pp. 138-144

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- How to stop a spinning object by humming and perceive curious blue arcs around a light; stroboscopic effects. Sci Am, Feb. '84, pp. 136-138, 140-141, 143-144, 148

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Using flash bulbs, magnesium, copper and sulphuric acid to demonstrate electricity production. Sci Teach, Jan. '84, p. 32

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The continuous spectrum of the sun -- deriving some of the sun's properties by means of solar spectrum analysis (data given). In: Culver, Introduction, pp. 74-79

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Radio transmitters; can hook up a key for telegraph transmissions or add a carbon microphone for voice transmissions. In: Math, Morse, pp. 68-73

The telegraph -- including sounder, hookup for two simple stations, base construction, electromagnet construction, sounder and key construction, etc. In: Math, Morse, pp. 11-21

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Telephone -- simple diagram of interior of earpiece and mouthpiece. In: Kent, Introduction, p. 39

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Edge waves form spokelike pattern when vibrations are set up in a liquid. Sci Am, Dec. '84, pp. 130, 135-138, 146

Group of acoustic demonstrations, including "visible sound vibrations," "musical bottle," "musical glass," tuning a guitar without using your ears, sound magnification with a balloon, and making an Aeolian harp and the "magical humming glass". In: McGill, Science, pp. 92-99

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In: U.S. Department of Energy, Science, pp. [17-18], and see also teacher's guide

How much meat in a hot dog -- testing for fat and water. Sci Teach, Mar. '84, p. 62

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- Nutrients in lake or ocean water: an evaporation experiment to
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- Why an iceberg floats -- demonstration of expansion of water on freezing.
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- Edge waves form spokelike pattern when vibrations are set up in a liquid. Sci Am, Dec. '84, pp. 130, 135-138, 146
- How the sun's reflection from water offers a means of calculating the slopes of waves. Sci Am, June '85, pp. 130-133
- Making waves: standing wave demonstration makes understanding atomic structure as easy as falling off a surfboard. Sci Teach, Nov. '85, pp. 28-30
- Waves: transverse and longitudinal waves, the Melde experiment, standing wave demonstrations, tuning forks, etc. In: Hilton, Physics, pp. 36-41

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BOOKS AND MAGAZINES

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BOOKS

The compiler has provided his opinion regarding the level of each book in relation to the intended student audience of grades six through to the end of high school. Books have been ranked "elementary", "intermediate" or "advanced" with respect to this audience. In this regard, however, much depends on the ability and interest of the student and certainly on the professional help and supervision that must be available to the student in using any of the material from this or the previous index.

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COMPUTERS & ELECTRONICS

- 1984 issues and issues of January to April 1985 were examined. Magazine ceased publication with April 1985 issue.
- title given in full when referred to in index

SCIENCE TEACHER (Washington, D.C.)

- Sci Teach used as abbreviation in index

SCIENTIFIC AMERICAN

- Sci Am used as abbreviation in index